The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders, and Postal Orders should be made payable to Benn Brothers, Ltd.*

Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, *have for some years past adopted the five-day week, and the editorial and general offices (Bouverie House, 154, Fleet Street, London, E.C.4) are closed on Saturdays.*

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Chemicals at the Fair

IF it was good policy to exhibit at the British Industries Fair the products of chemical industry in the years when no great results could be expected from such publicity, it must be still better policy, now that overseas trade is steadily recovering, to secure the fullest benefits from that recovery by the strongest appeal that is possible to our overseas visitors. This the chemical industry of this country has properly decided to do .At the British Industries Fair, to be opened in London and Birmingham simultaneously next Monday, British chemical industry will not only be numerically as well represented as on previous occasions, but will probably have a wider selection of potential clients than ever before. The chemical section, which is in the area marked K on the map, has again been organised by the Association of British Chemical Manufacturers, and Mr. Davidson Pratt and his assistants are entitled to some satisfaction in the knowledge that this year's arrangements are not below the high standard set in the past.

Of the Fair generally, it may be said at once that the London Section at the White City will be the largest of its kind ever held in this country. The space booked is over 300,000 square feet, as compared with 250,000 last year. The Birmingham Section, which is being conducted with great energy and local patriotism, has similarly overrun its contemplated area, and an open air section has had to be provided for the additional entries. As regards the important matter of buyers, the situation is reported to be equally satisfactory. The number of overseas firms which have intimated to the Department that they will be represented at the Fair is over six times as many as at the corresponding date last year, and the figure of nearly two thousand, which represented the actual number of buyers at the 1928 Fair, promises to be considerably exceeded. Every effort has been made, not merely to attract buyers, but to facilitate their work at the Fair. The catalogue of the White City Fair has classified indexes in nine languages. Special advance copies of this catalogue, with lists also of the 700 firms exhibiting at Birmingham, have been sent to 10,000 business men in Europe, North America, South Africa, and the eastern coast of South America, in time to reach them before they leave for England. A staff of interpreters will be available, and buyers will be invited to make use of the very comfortable club room provided for their convenience free of charge. Altogether about seventy countries will be represented by the buyers who will attend.

In accordance with precedent, only British manufacturing firms are permitted to exhibit at the Fair. The number at the White City this year is close on 1,300. The morning and early afternoon have always been reserved for buyers, as the primary object of the Fair is business; at the same time the Fair has a distinct educational interest for the general public, and it will accordingly be thrown open to them from 4 p.m., an hour earlier than usual, until 8 p.m. The absence of the King owing to illness will be deeply regretted; he has visited every fair held since 1920, and has on all his visits taken a keen interest in the British manufactures displayed. It is hoped, however, that the Queen will be able to pay a visit. In any case, the Prince of Wales has undertaken to speak at the Mansion House banquet on Monday, and his speech will be broadcast.

It will be seen from the plan of the chemical section and the preliminary notes on the principal chemical exhibits, published elsewhere in this issue, that every branch of chemical industry is again represented at the White City, and that the exhibitors at the Birmingham Fair also include a good proportion of firms directly or indirectly associated with industrial chemistry. Those with the necessary technical knowledge who are able to compare this year's exhibition with the earlier post-war exhibitions will find abundant evidence of the notable advances that have been made in every branch, while even the general spectator can hardly fail to be impressed with the place that chemi-

cal industry now occupies among the industries of the country. The site of the chemical section is practically the same as last year. For several years the chemical exhibits were grouped in the hall at the Shepherd's Bush entrance. This made the section a very complete unit, but it had this serious disadvantage—that the public passed through it on their way to the more general attractions instead of stopping and inspecting it for themselves. The more central position that the chemical section now occupies avoids this disadvantage; it looks just as well and it has the merit of a continual flow of visitors both ways.

Gas Light and Coke Progress

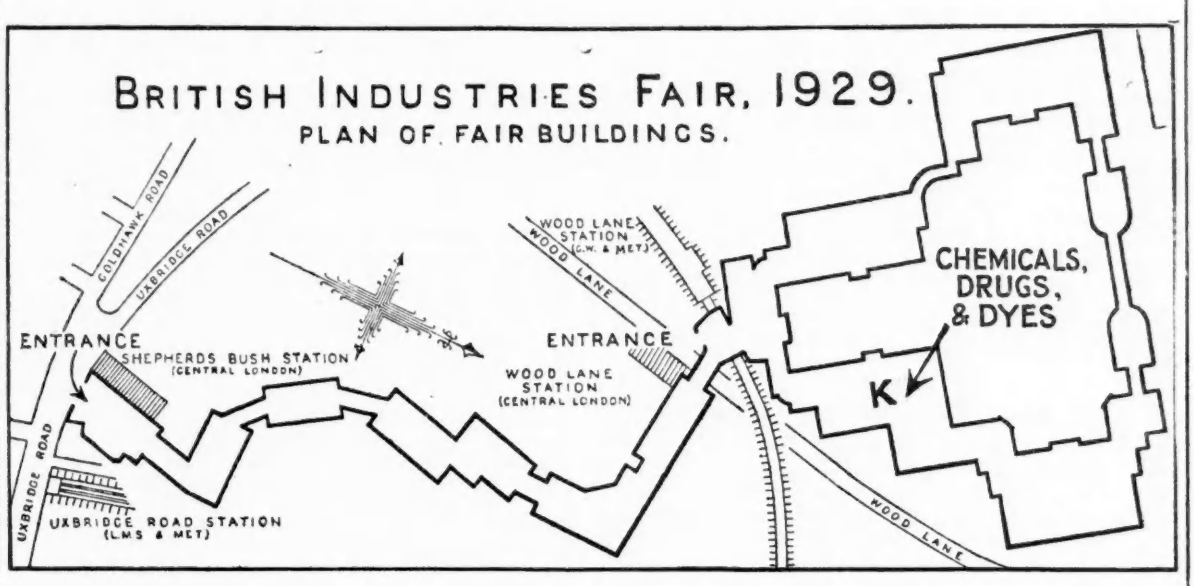
THE first general impression left by Sir D. Milne-Watson's able speech at the annual meeting of the Gas Light and Coke Co. is that, while the large modern gas undertaking has to struggle hard to make progress against the keen rivalry of other utility services, it may still succeed in doing so by means of a sufficiently energetic and progressive policy. To prevent the largest gas undertaking in the world from going back in the face of the competition that surrounds it would be no poor achievement; during the past year, however, the Gas Light and Coke Co. has actually gone ahead, and the record of the year's work is one on which the Governor, the shareholders, and the staff may all be sincerely congratulated.

The public estimate of the company's improved position is clearly indicated in the level of the company's stocks. The recently constituted £1 stock, which has been below par for some time, is now well above its nominal value; the company's 5 per cent. redeemable debentures, which were raised at 99 per cent., are over £101, while the 4 per cent. preference and the 3 per cent. debentures have appreciably improved. The reason, of course, for this improvement is that the company, which paid a dividend of 5½ per cent. for the June half year, is now able to declare a dividend of £5 12s., the full amount permissible with the price of gas at 8·6d. per therm. This result, satisfactory in itself, becomes still more satisfactory for the reason that the higher dividend corresponds to a lower selling price for gas; obviously the cheaper the commodity the larger is the use likely to be made of it, as well as the higher the dividend. The circumstances fully justify Sir D. Milne-Watson's claim that the progress of the past twelve months has been very satisfactory, and that never in the history of the company has its financial position been sounder and healthier. The company has reached its present dimensions by a courageous policy of amalgamation; that this policy is still believed in is demonstrated by the fact that arrangements are being made for the acquisition of two more undertakings.

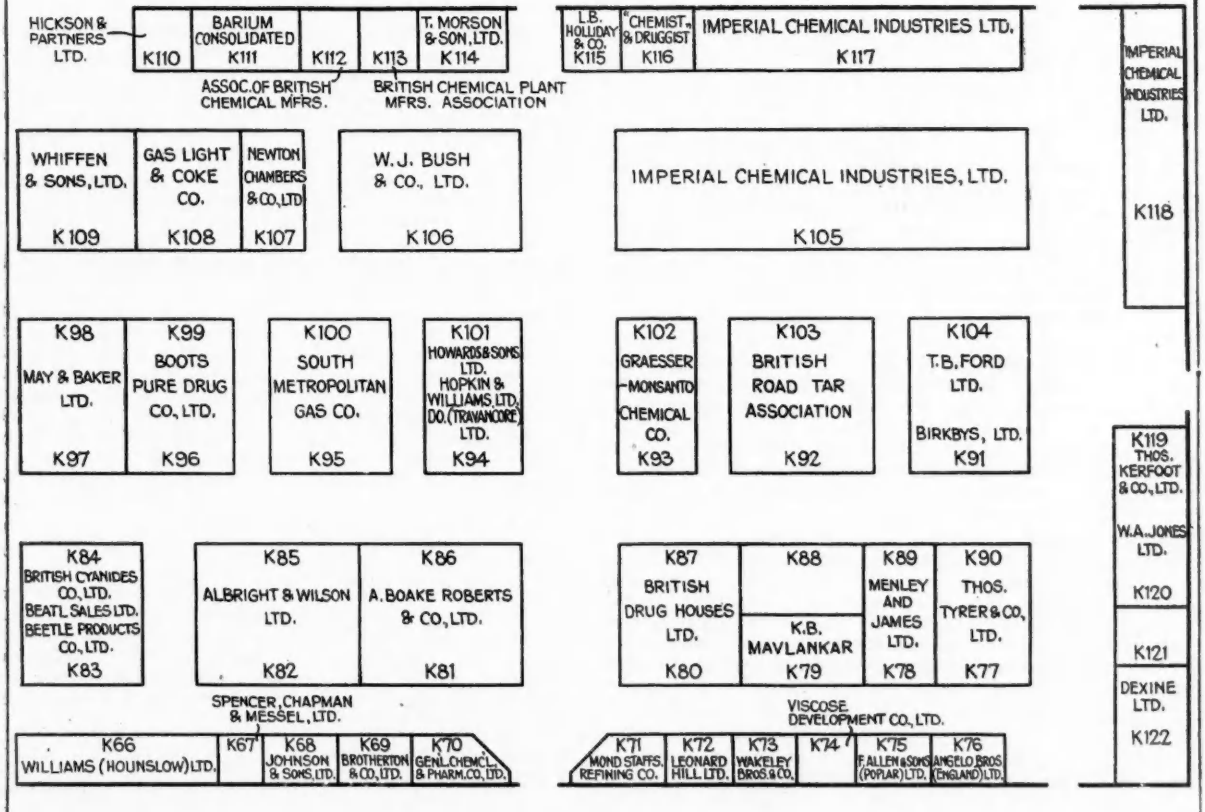
Not for the first time, Sir D. Milne-Watson emphasises, though indirectly, how essentially chemical the coal carbonisation industry is. The new central laboratory opened at the Fulham works last summer is not intended to save a penny here or there on raw materials or to extend the routine work of the laboratory; its essential purpose, working in conjunction with a full-scale experimental plant, is the prosecution of fundamental research on the carbonisation of coal and its products, both primary and residual. In this connection it is interesting to hear that the low temperature carbonisation plant which is being erected at Richmond, under a joint arrangement between the Company and the Government, is nearing completion, and it is hoped shortly to produce a new smokeless fuel named "Gloco," as well as to investigate the constitution and new uses of low temperature tars—a field which the Chemical Research Laboratory at Teddington is already exploring with good results. Another interesting contemplated enterprise is the installation of coke ovens at the Beckton works. Sir D. Milne-Watson takes the broad view that the gas industry and the coke oven industry are essentially one, since the common function of both is coal carbonisation, in the one with gas and in the other with metallurgical coke as the primary product. It seems to us not only a neighbourly but a statesmanlike policy to impress on both the value of working together for the industry which is fundamental to each of them instead of drifting into an attitude of mutual suspicion and hostility. On yet another point, Sir D. Milne-Watson will have the support and sympathy of all who understand the industry. That is, in the need of releasing the gas industry from the cramping effects of legislation passed in days when modern conditions were non-existent and had not even begun to be contemplated, and restoring to it reasonable freedom to work out its own salvation in its own way.

The Calendar

Feb.		
18	Institute of Chemistry and Society of Chemical Industry (Edinburgh Sections): Open Meeting for Short Papers on Recent Advances, New Apparatus, etc. 8 p.m.	North British Station Hotel, Edinburgh
18	Society of Chemical Industry (Yorkshire Section), Institute of Chemistry (Leeds Section) and Society of Public Analysts. "The Preservatives Act." C. H. Manley.	Great Northern Hotel, Leeds
19	Hull Chemical and Engineering Society: "Some Properties of Thin Films." Professor F. G. Tryhorn. 7.45 p.m.	Grey Street, Park Street, Hull
19	Institute of Metals (Birmingham Section): "Fuel." E. C. Evans. 7 p.m.	Engineers' Club, Waterloo Street, Birmingham
20	Institute of Chemistry (Huddersfield Section): Paper by R. L. Collett.	Huddersfield
20	Royal Society of Arts: "History of the Development of Fast Dyeing and Dyes." James Morton. 8 p.m.	John Street, Adelphi, London
20	Society of Glass Technology. 2.30 p.m.	Sheffield
20	Society of Dyers and Colourists (Midlands Section): "Steam Storage as an Aid to Economy in the Dyehouse." T. Nordenson. 7.30 p.m.	University College, Nottingham
21	Chemical Society. 8 p.m.	Burlington House, London
21	Society of Chemical Industry (Birmingham Section): "Communications from the Birmingham University Chemical Department." Professor W. N. Haworth. 7 p.m.	University Buildings, Edmund Street, Birmingham
21	Oil and Colour Chemists' Association: "The Fresco Ordeal: its Chemical and Artistic Implications." T. Wilson. 8 p.m.	Royal Society of Arts, John Street, Adelphi, London.
22	Imperial Chemical Industries: Inspection of new offices. 10.45 a.m.	Imperial Chemical House, Millbank, London.
23	British Association of Chemists (London Section): Annual Dinner	Les Gobelins Restaurant, Regent Street, London



Plan Showing Position of the Chemical Exhibits



Chemical Exhibits at the British Industries Fair

Preliminary Notes on the London and Birmingham Stands

THE British Industries Fair of 1929 opens on Monday next, February 18, simultaneously at the White City, London, and at Castle Bromwich, Birmingham, and will continue until Friday, March 1. The exhibits of chemicals, drugs, dyestuffs, etc., as usual, will be shown in the London Section, and will be housed, as last year, near the Wood Green entrance, in Hall K. The Birmingham Section, however, will also contain many exhibits of chemical interest, including, for example, paints and varnishes, and engineering plant. In our leader columns fuller reference is made to the general aspects of this year's Fair, and on the preceding page appears a ground plan of the Fair, showing the position of the chemical section and the arrangement of the stands included in it.

The London Chemical Section

Prospective Exhibits.

WE give below brief notices of the principal chemical exhibits to be shown at the London Section of the Fair :—

Albright and Wilson, Ltd., OLDBURY, NEAR BIRMINGHAM, will exhibit most of the fine chemicals for which the firm has a world-wide reputation ; these will include phosphorus and its compounds, carbon tetrachloride, ammonium persulphate, pure precipitated sulphur, calcium phosphate, and the aerating materials, " Antelope " and " Ibex." A special feature will be an exhibit to demonstrate the uses of silicon ester for stone preservation and restoration.

Angelo Bros. (England), Ltd., 45, ST. MARY AXE, LONDON, E.C.2, are exhibiting a wide range of shellacs suitable for any industry requiring this material.

Among the exhibits of **A. Boake Roberts and Co., Ltd.,** CARPENTERS ROAD, STRATFORD E.15, one will consist of a full range of solvents and plasticisers for use in the lacquer and varnish industries, especially interesting being benzyl abietate, which imparts flexibility to a film without causing softness. There will also be a complete display of terpeneless oils of the highest quality and concentration, and connected with it will be an exhibit of compounded perfumes, made to special formulæ, for use in the manufacture of soap, bath salts, creams, etc. Liquid sulphur dioxide will be shown in various types of container, to suit the purpose required, while there will be a display of technical and fine chemicals of the nature of sulphites, phosphates, and sulphonated oils, with illustrations of their applications. There will also be seen a wide range of flavourings, food colours, and preservatives suitable for all purposes.

Boot's Pure Drug Co., Ltd., STATION ROAD, NOTTINGHAM, will have a most interesting and extensive display of medicinal and other fine chemicals. For the convenience of buyers the exhibit is divided into four sections covering respectively—(1) medicinal agents sold in India and the Far East ;• (2) medical specialities on sale on the Continent ; (3) display of medicinal, hypodermic, and solution tablets ; (4) medical specialities such as liver extract, insulin, vaccines, etc.

The British Cyanides Co., Ltd., 49, WELLINGTON STREET, STRAND, W.C.2, and their associated companies, the Beetle Products Co., and Beatl Sales, Ltd., will be exhibiting an interesting range of synthetic resins and moulding powders in different colours for the production of non-fragile decorative and utility articles such as trays, tumblers and fruit sets, and of electrical mouldings and industrial articles. A moulding plant will be shown in actual operation.

The exhibit of **British Drug Houses, Ltd.,** GRAHAM STREET, CITY ROAD, E.1, will consist of specimens of some of their well-known products, including medicinal preparations, organo-therapeutic products, anæsthetics, alkaloids, synthetic chemicals used in medicine, research and general laboratory chemicals, and vitamin products. Of special interest are Insulin A.B. brand, carefully standardised and supervised for the treatment of diabetes ; liver extract, for the treatment of pernicious anæmia ; pure ether, specially made for anæsthetic purposes ; acriflavine, a well-known and valuable antiseptic ; S.U. P.36, the new form of treatment for common colds, influenza, etc. ; ephedrine, the new remedy for asthma and hay fever ; the vitamin products, which are becoming of increasing importance in medical science and are largely used to provide for deficiencies due to inadequate food or unhealthy conditions of life. Radiostol, which is synthetic vitamin D, is now produced with a standard degree of potency far greater than is obtainable from cod liver oil, and is incorporated in various preparations which are of the greatest value to the health of human beings.

Brotherton and Co., Ltd., CITY CHAMBERS, LEEDS, will have an exhibit that will include their well-known bleaching products such as sodium hydrosulphite and the various formosuls (formosul is sodium formaldehyde sulphoxylate) and a variety of fast dyestuffs of the basic, acid, and metachrome types.

W. J. Bush and Co., Ltd., ASH GROVE WORKS, HACKNEY, E.8. will show an interesting range of fruit essences and essential oils ; isolates and derivatives of essential oils ; perfumery chemicals, a new manufacture being amyl cinnamic aldehyde ; lacquer solvents ; and fine chemicals and dyestuffs intermediates. Of the last-mentioned series, there will be shown various chemicals of which the firm are the only makers in England.

The exhibit of **The Gas Light and Coke Co.,** HORSEFERRY ROAD, LONDON, S.W.1, comprises a wide range of the usual chemicals obtained as by-products from the manufacture of coal gas. Special mention might be made of their road tar and tar-bitumen compounds, naphthalene in various forms, including a special insecticide grade for horticultural work, salicylic acid of pure and technical grades, and prussian blues for making ink, papers, paints, etc.

The General Chemical and Pharmaceutical Co., Ltd., WILLESDEN, N.W.10, are exhibiting a wide range of their well-known and standardised " Judex " analytical reagents of guaranteed quality. The firm's catalogues, which will be supplied gratis on inquiry, are so arranged as to show the reagents most usually required by different branches of industry. There will also be an interesting exhibit of " Vulcan " chemicals used for electro-plating, process engraving, and other purposes. An exhibit of " Oasis " accumulator acid of high purity is of interest, in that the firm offers special facilities for overseas buyers. The firm is also prepared to undertake the manufacture, even in small quantities, of any chemical required for research work.

Hickson and Partners, INGS LANE, CASTLEFORD, will show an interesting exhibit of intermediates and dyes. Their intermediates cover dinitrophenol, dinitrochlorobenzene, metaphenylene diamine and meta-toluylene diamine, while their more important dyes are sulphur blacks and browns and magenta. Samples of fabric dyed with these agents will be shown. Their ortho- and para-dichlorobenzene will be of interest to insecticide and disinfectant manufacturers. A special quality of mirbane oil (nitrobenzene) for polishes, etc., will also be shown.

The well-known dyestuffs firm of **L. B. Holliday and Co., Ltd.,** 650, LEEDS ROAD, DEIGHTON, HUDDERSFIELD, will show only their latest productions, as their usual range of basic, substantive, acid, and chrome dyes is already known. There will be on view a number of new acid dyes of outstanding brilliance, some of which are now made for the first time in this country, and which are specially suitable for ladies' hats and dress goods. There are also some interesting new products for the dyeing of acetate silk, with excellent characteristics as regards fastness.

Hopkins and Williams, Ltd., 16, CROSS STREET, HATTON GARDEN, E.C.1, are showing an interesting and comprehensive range of organic and inorganic reagents for analytical and research purposes, indicators for P_H determinations and solutions used for mineral separation in geological research. There will be a fine collection of radio-active uranium-bearing minerals and the products therefrom. Driers for paint and

varnish makers will be of interest, as will also be an exhibit of barium sulphate for X-ray work and of "sera" rouge for optical work.

Hopkins and Williams (Travancore), Ltd., 16, CROSS STREET, HATTON GARDEN, E.C.1, will have an interesting collection of rare earth minerals, the most important being monazite sand. A pure white oxide of titanium, which is non-poisonous and of great use in the paint industry, is of special interest, in view of the objectional properties of white lead. There will be an exhibit of zirconium oxide for making refractory bricks and for use in the manufacture of white resistant enamels in place of white tin oxide.

Howard and Sons, Ltd., UPHALL WORKS, ILFORD, will have on view an interesting range of solvents and plasticisers for use in making nitrocellulose lacquers; of these special mention may be made of ethyl lactate and diacetone alcohol, which are very useful for brush lacquers, and of methyl cyclohexanol acetate (Barkite), which is of recent origin and is the most efficient and reliable plasticiser so far produced, as well as the cheapest. There will be a fine chemicals section, in which special mention should be made of thymol and synthetic menthol. In addition there will be a wide range of medicinal products, which have been made for many years and are known all over the world for their quality.

An outstanding exhibit in the Chemical Section will be that of **Imperial Chemical Industries, Ltd.,** which by the artifice and technique of display and arrangement conveys to the buyers an impression of the united front presented by over forty subsidiary and associated companies operating throughout the Empire and the world. The exhibit comprises the principal products of Imperial Chemical Industries, and includes heavy chemicals, explosives and ammunition, dyestuffs, metals and fertilisers, all of which are shown on a large site which has for its central feature a cinema hall. Here films will be shown continuously, illustrating the manufacture of heavy chemicals; "The Story of Beautiful Colours," describing the making of dyestuffs; "The Use of Blasting Explosives," depicting a fall of 30,000 tons of lime stone; and a film showing by examples the uses of fertilisers and their benefit to agriculture. Overseas buyers at the Fair need no reminder that the products of this great company are exported to all parts of the world, where Imperial Chemical Industries has representatives and agents totalling nearly 500, so that the most distant outpost of the company becomes a link in a chain by which the buyer may avail himself of the vast resources and researches of Imperial Chemical Industries. Buyers visiting the White City will be able to obtain information concerning the products of Imperial Chemical Industries from representatives at the stand, and literature dealing with specific products will be available.

As in previous years, **Johnson Matthey and Co., Ltd.,** 73–83, HATTON GARDEN, LONDON, E.C.1, will exhibit platinum, gold, silver and other precious metals in their native forms, and as supplied to the chemical industry. A prominent feature in this connection will be a fine silver condensing coil, such as those in use in many of the large chemical houses, 53 in. in height, and of a diameter of 18 in. The firm will also show these metals in their various forms of sheet, wire, tube, gauze, and chemical compounds, such as silver nitrate, platinum chloride, and other leading specialities. Apparatus in the form of electrodes will also form part of the exhibit. Although the exhibit is in the jewellery section of the Fair, it is a composite one, and will show the firm's connection with the many industries whose needs they supply, and therefore, will be of general interest. Besides the chemical industry, they supply many of the requirements of the pottery, ceramic, photographic, electrical, jewellery, artificial silk and motor trades. They are also the largest extractors of precious metals from such residues as contain them.

Johnson and Sons, Manufacturing Chemists, Ltd., HENDON WAY, N.W.4, will exhibit a complete range of photographic developers and reagents both in the form in which they are made and as packed for sale at home and abroad. Their productions meet the requirements of process engravers, amateur photographers, and radiologists. There is also a display of fine chemicals, including salts of precious metals, such as silver nitrate and gold chloride, collodions, varnishes, and pure standardised chemicals for process engravers.

The products of **May and Baker, Ltd.,** GARDEN WHARF, BATTERSEA, S.W.11, cover a very wide range, and among them will be found, on the one hand, chemicals of interest to many branches of technical industry, and on the other, some of the latest achievements of science in the application of chemistry to the cure of disease. In the latter field mention may be made of the latest arsenical products for the treatment of syphilis and tropical diseases, e.g., metarseno-argenticum, tryparsamide, stovarsol, parosan and quinine troposan. The new uses of bismuth in medicine will be well demonstrated, as will also be the new products for the diagnosis of conditions affecting the gall bladder and the treatment of chronic arthritis. Ephedrine for hay fever and asthma, new mercury compounds, hynotics, sedatives, anæsthetics, and a variety of pharmaceutical products will be also shown. On the industrial side, there will be an interesting range of mercury salts and of solvents suitable for many different purposes.

The display of **Thomas Morson and Son, Ltd.,** 47, GRAY'S INN ROAD, W.C.1, will consist of a comprehensive exhibit of fine pharmaceutical, research, and industrial chemicals, too numerous to mention. Cadmium colours for the ceramic and other industries are well worth special note, as are also "osmo"-kaolin for soap manufacturers, and pexuloid for making non-inflammable celluloid splints without evolving toxic vapours.

Newton Chambers and Co., Ltd., THORNCLIFFE IRONWORKS, NEAR SHEFFIELD, who are makers of the well-known and widely used disinfectant "Izal," are exhibiting an interesting range of coal tar products used for various purposes.

The South Metropolitan Gas Co., 709, OLD KENT ROAD, S.E.15, is showing a range of organic and inorganic compounds resulting from the manufacture and purification of coal gas.

The exhibit of **Spencer Chapman and Messel, Ltd.,** 36, MARK LANE, E.C.3, will consist of a range of the well-known inorganic acids in various strengths and degrees of purity.

Thorium, Ltd., 16, CROSS STREET, HATTON GARDEN, E.C.1, will show a comprehensive range of rare earth products at surprisingly low prices. The exhibit will include thorium nitrate for the incandescent gas mantle industry and technical cerium compounds used in medicine and in the production of electric arc carbons, varieties of glass, and pyrophoric alloys. There will also be an interesting exhibit of mesothorium, which is now being used medicinally and in the manufacture of luminous compounds in place of radium.

Thomas Tyrer and Co., Ltd., STIRLING CHEMICAL WORKS, STRATFORD, E.15, will have an exhibit consisting of paint driers, different brands of cadmium sulphide for the rubber industry, and nickel formates used in the production of metallic nickel for use as a hydrogenation catalyst, of which they are the only British makers. There will also be an interesting range of reagent chemicals of the "Sterling" brand. The firm's medicinal bismuth of all densities, but of non-varying purity, is also worth mention.

Wakeley Bros. and Co., Ltd., HONDURAS WHARF, BANKSIDE, LONDON, S.E.1, will show an interesting exhibit of fertilisers, worm killers, and weed killers, specially designed for garden use.

A feature of special interest in the exhibit of **Whiffen and Sons, Ltd.,** CARNWATH ROAD, FULHAM, S.W.6, is the new therapeutic agent, methyl stannic iodide, sold under the name of Staniform. It is odourless, and in the form of an ointment it has numerous valuable applications because of the rapid manner in which it eases pain and promotes healing. There will also be an interesting range of iodides, alkaloids, and bromine preparations used in medicine. Salicin, the well-known remedy for influenza and rheumatism, will also be shown, together with nicotine of medicinal and commercial grades.

Williams (Hounslow), Ltd., HOUNSLOW, MIDDLESEX, specialise in dyes soluble in many solvents and suitable for all sorts of purposes, from bath salts to textiles, and their exhibit will include samples not only of dyes but also of various classes of dyed materials to show the effects produced. There will also be an interesting range of harmless colours for use in foodstuffs. These can be supplied to suit the legal requirements of all the principal countries of the world.

The proprietors of **The Chemical Age,** Benn Brothers, Ltd., will exhibit this and their numerous other publications at Stand M37. Subscribers, advertisers and other visitors will be welcomed at the stand, and are invited to make use of its staff for the dictation of correspondence, of its telephone, etc.

The Birmingham Section

Chemical and Metallurgical Exhibits

THE following notes deal with exhibits of chemical and metallurgical interest at the Birmingham Section of the Fair :—

Air Compressors.

The display of products of Petters, Ltd., of Yeovil, at Stand No. 6, Block 17 J, includes a 1½ B.H.P. Petter air compressor set, consisting of a Reavell compressor direct coupled to a Petter 1½ B.H.P. hopper-cooled magneto ignition engine. This small, self-contained plant is suitable for a wide range of uses, such as spraying and other purposes for which compressed air is required. An air pressure up to 300 lb. per square inch is quickly obtained by means of it. It will be shown in operation. The exhibits will also include a number of the engines produced by Petters, including the new Petter "T" type 25 B.H.P. "Atomic Diesel" engine, shown in public for the first time.

Bakelite and Beetle Powder Mouldings.

At Stand No. 10 G/2, the Streetly Manufacturing Co., Ltd., of Streetly, near Sutton Coldfield, are showing a variety of articles used in the motor, electrical and other industries, moulded from Bakelite and Beetle powders. Hitherto mouldings from synthetic resinous compounds have been largely limited to the darker shades, but the introduction of Beetle powders has made possible their manufacture in all colours—plain or mottled. Beetle mouldings show great lustre and translucency, and possess the properties of insulation, tensile strength, and durability in a marked degree.

Bureau of Information on Nickel.

The exhibits of the Bureau of Information on Nickel, Ltd., of 2, Metal Exchange Buildings, Leadenhall Avenue, London, include typical examples of the more important alloys of nickel and their applications, and are grouped in the following classes: nickel alloy steels, nickel brass and bronze, heat-resistant alloys, nickel cast iron, nickel copper, malleable nickel, and nickel plating. Among the most interesting things from a chemical point of view, are the corrosion-resistant steels. The examples shown in this class include samples of "Anka"; stainless steel tubing containing fairly high percentages of nickel and chromium, and a special nickel-chrome silicon steel combining resistance to heat and corrosion. The use of nickel bronzes in plant exposed to the erosive and corrosive effect of steam receives attention. Copper-nickel tubes are exhibited, illustrating the corrosion-resisting properties of nickel-copper alloys. Seamless nickel tubing shows the use of malleable nickel in dairy operations. Mention may also be made of the exhibit dealing with heat-resisting alloys. These include a group of alloys consisting chiefly of nickel, chromium and iron (which show excellent mechanical properties and strength at 650-1,200° C.), as well as a 96/4 nickel-manganese alloy for use in bolts holding together fire bricks in furnaces.

A Degreasing Machine.

Visitors who are interested in degreasing problems will find on Stand 9K/2 an apparatus which dissolves oil and grease with amazing rapidity, but does not in any way harm the most delicate of metals. The apparatus effectively degreases successive loads of greasy machine or metal parts without the necessity of changing the chemical bath supplying the non-inflammable solvent. The process greatly reduces labour costs and effects a great saving of time. Demonstrations of this apparatus, which is known as Crawshaw's Chemical Colander, and which is placed on the market by Imperial Chemical Industries, Ltd., will be given daily on Stand 9K/2.

Electrical Transmission Line Tower.

The exhibit of Braithwaite and Co. (Engineers), Ltd., at Stands No. A/1 and 2 (outside space) will show an actual transmission line tower of the type which will be used for the "grid" electrical transmission scheme in the South Eastern Counties. The company has built a tower specially to show the design and means of construction, while Steatite and Porcelain Products, Ltd., have fitted up the tower with actual insulators of the type which are to be used. The æsthetic merits of this tower are self-evident. The structural merits are very graphically demonstrated by the fact that, suspended from the porcelain insulators, on one of the cable arms, are two railway goods wagons. The particular merit from a demonstration point of view of this test, lies, of course, in the fact that the load is eccentric, the whole of the weight being taken by one side of the tower, and that it is not evenly distributed as it will be when the tower is actually in its ultimate position.

Equipment for Electro-Plating and Finishing.

An extensive range of equipment of special interest to the metal finishing trades, for electro-plating, polishing and finishing, will be shown by W. Canning and Co., Ltd., of Birmingham. The exhibit which will command the most general interest is that dealing with the deposition of chromium. The chromium equipment manufactured by this firm has been considerably improved and brought up to date since the last Fair, and is being successfully used by a very large range of manufacturers. The Canning system of warm nickel plating is another feature of outstanding interest, as the equipment gives an improved deposit of nickel in a considerably shorter time. There will be a special exhibit of large low-voltage electro-plating generators, the manufacture of which is one of the great specialities of the firm. There will also be automatic polishing lathes, a cabinet for lacquer spraying, a full range of Canning lacquers, and a display of electro-plating barrels of the latest pattern.

Finishes for Various Products and Trades.

At Stand No.2/7 F, Thomas Howse, Ltd., of Quinton Works, Blackheath, near Birmingham, will exhibit a full range of finishes for the hardware, motor and cycle accessory, engineering and electrical trades, etc., as well as special technical products and decorative materials. The exhibit will comprise recognised standards of finish and recent innovations resulting from newer materials or operating methods. In many cases they serve a protective as well as a decorative purpose. Among illustrations of recent developments will be special compositions made with the latest types of synthetic resins and the most modern solvents on different surfaces in metal, fabric, leather, timber, paper, etc. The latest types of decorative enamels made on the lines of cellulose lacquers but employing the skill of the decorator and securing results similar to the older type linseed oil enamels, together with a range of insulating metal cutting and preserving compositions, will also appear.

Monel Metal and Pure Malleable Nickel.

The stand of Monel-Weir, Ltd., of Cathcart, Glasgow (No. 1, Block 13 F), is an epitome of the range of applications of Monel metal and pure malleable nickel in post-war industry. Applications of these metals in power plant are illustrated by a model marine condenser, with full-size tubes, round which are grouped pumps, the standard output of G. and J. Weir, Ltd., fitted with Monel metal rods, valves, etc., and also their high speed turbine driven feed pumps; as well as valves and cocks, flexible metallic hose, etc. The uses of the metals above mentioned in the manufacture of chemical plant include a centrifugal basket by Pott, Cassels and Williamson, of Motherwell, of solid Monel metal throughout; solid drawn tubes in a wide variety of sizes, used for such purposes as heating and cooling coils, evaporators, etc., handling such corrosive agents as caustic soda, tanning liquor, dyes, and so on. Textile plant manufacture is represented by a full-sized jigger lining in Monel metal, along with true-to-scale models of different types of dye tanks and vats. Numerous other aspects of the use of Monel metal are demonstrated by exhibits which include a steam-jacketed pan; a soda fountain; emulsifiers by Burt, Bolton and Haywood, and by Ferns' Emulsifiers, Ltd.; cooking utensils (in pure nickel); and others. The ornamental value of Monel metal for shop fronts is represented by a model shop. Dairy plant is represented by a pure nickel-lined pasteuriser by the Aluminium Plant and Vessel Co., of London

Paints, Cellulose Finishes and Enamels.

An interesting stand is No. 9K/1, where the visitor may see some of the latest developments in cellulose finishes for all industrial purposes, cellulose wood finishes, coloured furniture

enamels, lacquers for wood and metal, and spray enamels, which also include cracking enamels providing some fine and bizarre effects. Another product which always attracts considerable interest is Necol plastic wood, which, like putty when fresh, is, when set, like wood. Other items well worth inspection are Naylors' varnishes, paints and stains, Necol coloured frosting enamels, and Crane lacquers. The companies associated with Imperial Chemical Industries, Ltd., exhibiting these products are Nobel Chemical Finishes, Ltd., Naylor Brothers (London), Ltd., and the Fredk. Crane Chemical Co., Ltd.

PERFORATED METAL, WOVEN WIRE AND SHEET METAL.

An extensive array of all kinds of perforated metal, woven wire and sheet metal work will be shown by G. A. Harvey and Co. (London), Ltd., at Stand No. 3, Block K 8. Perforated metals for all purposes are displayed, showing the remarkable number of uses to which this material is put, and the varied patterns obtainable; as well as woven wire cloths of all meshes and gauges up to 200 mesh. The firm specialises in sheet metal and plate work of all descriptions, up to one inch thick, and the works (Greenwich Metal Works, Woolwich Road, London) are equipped with modern machinery and every facility for the economical production of all kinds of oil storage tanks up to 116 ft. diameter, condensers, tar stills, cement kilns, creosoting cylinders, digesters and pressure vessels up to any pressure.

STAINLESS AND STAYBRITE STEELS.

As is only natural, stainless and Staybrite steels will be the prominent exhibits on Stands Nos. 10F/1 and 10G/1, occupied by Thos. Firth and Sons, Ltd., of Sheffield. So rapid has been the development of "Firth Staybrite" steel, particularly, that ingots weighing 25 tons have to be produced to keep pace with the demand. The applications of this super-rustless and acid-resisting steel will be demonstrated in innumerable forms, including dyeing machines, pump impellers, and other objects of interest to the chemical and allied industries. Attention is being focussed upon the economies attendant upon the use of polished sheets of "Firth Staybrite" as the starting point in the manufacture of many articles which require piercing, pressing or stamping. Many examples of articles produced in this way will be shown, together with polished sheets in the various finishes obtainable from the Blackheath works of the company. Firth's other specialities, such as their special alloy steels, will also be shown, together with a range of products from the Firth engineers' tool department.

STAINLESS STEEL, GALVANISING, AND WELDING.

Generally speaking, the exhibit of Thompson Brothers (Bilston), Ltd., of Bradley Engineering Works, Bilston, at Stand 17 H/4 is divided into four sections:—Stainless and heat resisting steel, petrol storage plant, a galvanising section, and general work including pressings, fire-and electrically-welded work and other mild steel work in general. The stainless steel section will have a jacketed pan for food pastes and a small stainless steel pan for nitric acid, both of Firth's Staybrite super stainless steel. An interesting exhibit will be a range of about thirty vessels, each containing a corrosive medium. These represent all conditions that would arise in actual practice, and it is understood that some of the specimens have been in test for about six months. The material being tested includes Firth's Staybrite, Hadfields' C.R.I., Weir's Monel metal and nickel, Wiggins' Corronil, etc. A new heat-treatment pot manufactured from Hadfield's H.R. 2 steel is shown alongside a pot that has actually run approximately 2,000 hours under actual working conditions; as well as a piece of muffle tubing in Hadfield's H.R. 2 steel. In the galvanising section, there is shown a case of galvanised parts by various friends of the firm, the galvanising being done with plant manufactured by Thompson Brothers; a model galvanising machine showing how the T.B. plant works, and illustrating its chief points of advantage; a sheet galvanised with T.B. plant under working conditions; and a galvanising bath. The general section of the exhibit will show typical examples of fire-welded, electrically-welded and pressed mild steel work manufactured by Thompson Brothers.

STEATITE AND PORCELAIN PRODUCTS.

Steatite and Porcelain Products, Ltd. (a subsidiary of Imperial Chemical Industries, Ltd.), will show an exhibit, at Stands No. A/1 and 2 (outside space), of four strings of standard insulators suspended from a tower which is itself being erected by Braithwaite and Co. (Engineers), Ltd. The tower is a standard one similar to those used in the high tension transmission lines now being erected all over England by the Electricity Commissioners, and the special feature of the insulators is that the pins are fixed by purely mechanical means, and have an extremely high mechanical strength. To illustrate this, on a single string of insulators two full size railway trucks, 19 ft. overall, are being hung, the total weight of the two trucks being nearly 15 tons. The carrying capacity of each insulator is 20 tons and they offer a very high margin of safety and very great security against any possibility of interruption of the current. A very large works with an area of over 5 acres has been erected at Stourport in Worcestershire for the production of these insulators, which have never previously been manufactured in the British Empire.

TUBES, COILS, VICTAULIC JOINTS AND FITTINGS, ETC.

This year two stands (No. 4, Block 17L, and No. 1, Block 11D) are occupied by Stewarts and Lloyds, Ltd., of 41, Oswald Street, Glasgow. Samples are shown of all the commonly used tubes and fittings. A few of the large variety of coils made are exhibited. Sectioned joints of the type used in oilfield work will be of interest to all handling oil, as will the exhibit of welded joints, which are specially valuable where the greatest security against leakage is desired. The Victaulic joint and Victaulic fittings are well represented, and the mode of action and capabilities are demonstrated by special working models. These joints are suitable for the conveyance of all ordinary fluids, are leakproof, flexible and provide for expansion and contraction. Another exhibit is that of sectioned flanges welded on tubes for use with steam at 815 lb. per square inch and 833° F. These are similar to flanges in actual use at present, and in view of the tendency to still higher pressures and temperatures for many purposes are of particular interest. Among the exhibits on Stand 4/17L are the Victaulic joints and fittings; welded joint tubes; gas, steam, water and galvanised fittings; steel, welded steel, and wrought iron tubes; high pressure steam tubes, etc. Among those on Stand 1/11D are wrought iron and steel tubes for the conveyance of gas, water, steam, compressed air, etc., with the necessary fittings; tubes and fittings with Victaulic joints, showing flexibility, etc., under gas pressure; Victaulic hand-operated tools, with which demonstrations will be given of methods of grooving plain-ended tube, and many other things of interest.

Joint Gas Conference

In connection with the Birmingham section of the Fair, a Joint Gas Conference will be held on Tuesday, Wednesday and Thursday, February 19, 20 and 21. The proceedings on the Thursday will be an industrial session, the conference assembling at 10 a.m., at the Birmingham and Midland Institute, Paradise Street, where Dr. C. M. Walters will give a description of the gas-heated industrial appliances in use in the works to be subsequently visited. Visits will be paid to the Birmingham Gas Department Industrial Research Laboratories, demonstration rooms and heat treatment shops, and to various works. Luncheon will be taken in the Conference Hall at the Fair.

The City of Birmingham Handbook

With its usual enterprise, the Birmingham Corporation has, in connection with the British Industries Fair at Castle Bromwich, prepared for distribution among visitors *The City of Birmingham Handbook*, 1928–1929 (pp. 304). The handbook deals with the history, growth and development of the city; its civic management; its art gallery, orchestra, etc.; its various public works, undertakings and estates, including sections on gas, electricity, transport and the municipal bank; the University and the technical college, and so on. There is a useful list of hotels and boarding houses. Numerous illustrations add to the value of the book, the possession of which should greatly enhance the interest and enjoyment to be obtained from a visit to the Birmingham Section of the Fair. The compilation and editorial work in connection with the production of the handbook have been in the hands of Mr. W. S. Body, chief clerk in the Town Clerk's office.

Surface Energy in Chemical Engineering

A Paper by Professor W. E. Gibbs

At a meeting of the Chemical Engineering Group of the Society of Chemical Industry, in the House of the Royal Society of Arts, London, on Friday, February 8 (the chairman of the Group, Mr. H. Talbot, presiding), a paper entitled "The Rôle of Surface Energy in Chemical Engineering" was read by Professor W. E. Gibbs.

THE surface of every liquid or solid, said Professor Gibbs, possessed free energy, which manifested itself as an attractional force tending to arrest and detain some of the molecules which brushed against the surface from outside. It manifested itself also as a tensile force which acted along the surface in all directions and tended to reduce the area of the surface to a minimum. The effect of such surface forces was enormously increased when the area of the surface was greatly extended by dispersing the substance in a finely-divided condition in a gaseous or liquid, or, in some cases, a solid medium.

These surface forces played an important part in such chemical engineering operations as the disintegration of solids and liquids by grinding or spraying, the condensation of vapours, the coagulation of precipitates and the clarification of liquids, the making and breaking of emulsions, the separation of a mixed powder into its constituents by flotation, and the grinding of pigments. They played a determining part in the preparation and use of lubricants, and in the manufacture of rubber goods, artificial silk, cements, plastics, lacquers, paints, soap, emulsions, margarine, and so on.

Inter-Molecular Forces

A molecule possessed some form of energy—probably electro-magnetic in character—by means of which it was able to exert an attractive force upon neighbouring molecules. The attractional force between two molecules had an exceedingly short range, for it appeared to vary inversely as some fairly high power—possibly the eighth power—of the distance between the centres. Consequently, although the attractional force was extremely great when the molecules were in close proximity, *e.g.*, when they were separated by a distance of the order of one molecular diameter, it diminished very rapidly as they moved apart. When they were several molecular diameters apart this force was relatively insignificant although, even then, it might be large when compared with the force due to gravitation.

The inter-molecular force of attraction produced the phenomenon of cohesion. The kinetic energy of the molecules urging them apart balanced the cohesive force which was drawing them together.

The high kinetic energy of a gas molecule ensured its comparative freedom. The molecules of a liquid were much more crowded together than were those of a gas: 1,700 c.c. of water vapour at 100° C. became 1 c.c. of water at the same temperature. Of this 1 c.c. of water, about four-fifths was empty space.

If the liquid were cooled the molecules moved less rapidly, the centrifugal force became less, and the force of cohesion drew the molecules more closely together into a new position of equilibrium. The liquid contracted, and the viscosity of the liquid increased.

Surface Tension

A molecule in the interior of the liquid was attracted on all sides by the neighbouring molecules. A molecule in the surface of the liquid was attracted by molecules adjacent to it in the surface or just beneath it in the liquid. The molecule was, therefore, acted upon by an unbalanced set of forces the resultant of which was a force acting normal to the surface of the liquid and tending to draw the molecule into the interior. The outward and visible sign of this inward pull was the behaviour of the surface in offering a definite resistance to any force tending to extend it. The magnitude of this contractile force, or surface tension, was peculiar to a given liquid.

They could readily measure the work that must be done to extend the surface of a liquid by a given area. During the extension of the surface, some of the kinetic energy of the molecules was expended in passing from the interior of the liquid into the new surface. A corresponding amount of heat was absorbed from outside to restore the temperature of the surface molecules to that of the bulk of the liquid. This amount of heat was called the latent heat of the surface. The total energy of the surface, therefore, consisted of the amount of work done against surface tension plus the amount of heat that had been absorbed and rendered latent during the formation of the surface. The free or potential energy of water at 0° C. amounted to 75 ergs per square centimetre, and the latent heat energy was equivalent to 40 ergs. Normally, they were only concerned with the free energy of the surface, and this quantity would be meant when they used the term surface energy.

Adsorption

In the crystalline state atoms, or groups of atoms, were arranged at definite distances apart in a three-dimensional space lattice. The atoms of which the face of a crystal was made up possessed an amount of free energy which depended upon the configuration of the atoms immediately adjacent to them in the interior of the crystal. The attractional force which was exerted by the clean surface of a solid was generally selective, varying in character and intensity from atom to atom.

A newly-formed surface was very active, and tended to cover itself with a layer of molecules drawn from its immediate surroundings. Molecules of different substances would be "adsorbed" in this way by a given surface, with different degrees of intensity depending primarily upon the character and intensity of the free energy of the adsorbed molecule. Under suitable conditions, therefore, adsorption tended to be selective. The arts of dyeing and tanning, the clarification of liquids, either by the addition of colloids or electrolytes, the prevention of scale formation in boilers and evaporators, etc., were largely made possible by the selective character of the adsorption process.

When a new surface is formed, either by breaking a solid, as in a mill or disintegrator, or by spraying a liquid, the new surface immediately became coated with a film of adsorbed air, or of whatever gas might be present. The amount of gas that could be adsorbed in this way, *e.g.*, when a solid was ground to a fine powder in a disintegrator, was very considerable, owing to the enormous area of the surface that was formed. The presence of these adsorbed gas films made wetting difficult.

Scale Prevention

Many substances, *e.g.*, calcium sulphate, when first precipitated from a hot solution were in a labile condition. In such a condition they possessed a greater amount of free surface energy than when they had become transformed into the stable form. This was indicated by the greater solubility of the labile form. Under certain conditions calcium sulphate was thrown out of solution in this relatively active labile form, $CaSO_4, \frac{1}{2}H_2O$. It was formed initially at the evaporating surface and from there it was carried round by the circulation of the water until it came into contact with the heated surface. Here, provided it was still active, it adhered to produce a scale. If, however, the solution contained a sufficient quantity of a suitable material in a finely divided or, preferably, in a colloidal condition, the newly-formed particles of calcium sulphate became coated with the added material and rendered inactive, so that instead of forming scale upon the heating surface they remained in suspension and gradually agglomerated and fell to the bottom of the vessel as a sludge. Many freshly-formed precipitates could be consolidated in this manner by the pre-addition of other suitable precipitated materials or colloids.

Emulsification

When two immiscible liquids, e.g., paraffin and water, were agitated together vigorously so as to disperse one of them in the other in the form of fine droplets, the surface of each liquid was greatly extended and a correspondingly large quantity of free energy was produced at the interface. Gradually, as the drops coalesced, the stored-up surface energy was expended. Finally, the liquids reverted to the original separate layers separated by a plane interface.

The rate at which the system returned to this condition, *i.e.*, the degree of stability of such a temporary emulsion, depended upon the concentration, i.e., upon the size of the droplets and their distance apart, and upon the viscosity of the external phase. The presence upon the droplets of electrical charges of like sign tended to keep them apart, and so increased the stability. It was generally necessary to stabilise an emulsion, by reducing greatly its interfacial tension and by preventing coalescence of the droplets, either by increasing the viscosity of the external phase or by forming protective films or membranes round the droplets. Thus the interfacial tension of water and benzene was 35 dynes/cm. If the water phase contained NaCl and NaOH in 0·1 normal concentration, and the benzene contained 0·1 N. oleic acid, the interfacial tension was reduced to 0·04 dyne/cm. Such a mixture would emulsify spontaneously, and remain stable for years.

In most cases, however, it was necessary not only to reduce the interfacial tension, but also to surround the droplets with protective films, so that even when they came into contact they will not easily be ruptured. Emulsification could be facilitated and the emulsion stablised by the use of an emulsifying agent, which by reducing considerably the interfacial tension, diminished the work that had to be done to bring about the required extension of surface while, by becoming adsorbed at the interface, it formed a film which mechanically protected the droplets.

De-emulsification

An equally important technical problem which frequently arose was the separation of an emulsion into its constituents. Petroleum deposits often became contaminated with water which infiltrated during the drilling operations. This water became emulsified in the oil to form exceedingly stable emulsions which may contain as much as 60 per cent. water. The oil might be " dehydrated " electrically by passing it between a series of electrodes between which passed a high-tension alternating current.

In many cases where the stability of the emulsion was due to the electrical charges upon the droplets the emulsion could be broken by the addition of suitable electrolytes, e.g., HCl, alum, ferric, chloride, etc. The added ions neutralised the charges upon the particles, and so led to the breakdown of the protective film. Often when an emulsion was stabilised by an oil-soluble emulsifying agent it could be broken by adding a suitable quantity of a water-soluble colloid.

Both emulsions of the oil-in-water type and the water-in-oil type could be separated by suitable centrifugal treatment, depending upon the difference between the specific gravity of the two phases.

Flotation

The process of separating the ore particles of a finely-ground ore from the particles of gangue by floation was an ingenious and successful application of surface phenomena. The process depended upon the fact that mineral sulphides, e.g., galena, were wetted by certain oily liquids but not by water, whereas particles of quartz were wetted by water but not by those other liquids. If, therefore, the finely-divided ore was agitated with a fine oil/water froth the sulphide particles would be preferentially wetted by the oil films surrounding the bubbles of the froth, while the quartz remained in the water phase. The bubbles, to the surfaces of which the sulphide particles were attached, were floated to the surface by a stream of air and separated from the gangue particles which remained at the bottom of the container. Finely divided coal could be freed from the greater part of its ash-forming constituents by flotation with a mixture of six parts of x-naphthylamine and four parts of xylidene. The quantity used amounted to 0·43 to 1·11 lb. per ton of coal treated.

The Trent Process

When fine coal was mixed with water and then agitated with an amount of oil equal to about 25 or 30 per cent. of its weight the coal became wetted by the oil and formed a pasty agglomerate or amalgam. Initially the particles of coal were wetted by the water. This water was then displaced by the oil. They gradually drew together, rejected the entangled water and form the pasty mass. Only mineral matter which had already been separated from the coal by the crushing process could be removed by this means. The sulphur content of the coal was practically unchanged. The ash was reduced from 35 to 70 per cent. ; the recovery of combustible ranged from 95 to 99 per cent.

Lubrication

Friction was due to the mutual attraction which existed between two surfaces in contact. Clean surfaces had the highest static friction obtainable. Lubrication consisted in eliminating, or at any rate minimising, this interfacial attraction as far as possible either by separating the surfaces by a relatively thick layer of lubricant—complete or fluid lubrication—or by simply covering each of the bearing surfaces with an adsorbed film of lubricant which substituted for the strong attractional forces exerted by the surface atoms of the solids the relatively weak forces exerted by the molecules of the adsorbed oil films. This was described as boundary lubrication.

Complete or fluid lubrication was obtained in low-pressure bearings, boundary lubrication when the pressure was high.

Contact Catalysis

Many gas reactions actually occurred at the surface of the containing vessel or at the surface of some material present in the gas space. These reactions were known as " surface " or " contact " reactions. In some way the wall or surface accelerated, or catalysed, the given reaction. Familiar examples were provided by the manufacture of sulphuric acid by the contact process, the manufacture of ammonia by the Haber process, surface combustion, and the hardening of oils.

Since the degree of adsorption varied from point to point of a given surface, either because of variations in curvature or in chemical composition, the catalytic action might be restricted to particular portions of the surface. A scratched glass surface was frequently more active than a plane or fused glass surface. When a film of a metal catalyst in a finely-divided condition was prepared by reducing a highly disperse film of the oxide which had been obtained by igniting a piece of pumice stone saturated with a solution of the nitrate of the metal, it was found that only a proportion of the metal atoms in the film were active. These appeared to be the atoms which occupied peaks in the film surface. Owing to the high rate of curvature at such points these would be the most active atoms in the surface ; they would possess the greatest amount of free energy.

A catalyst might be poisoned by the presence in the gas mixture of traces of certain gases, e.g., H_2S, which were adsorbed by the catalyst more readily than the reacting gases, and formed adsorbed layers which were in themselves inactive and effectively arrested the reaction.

Discussion

Professor J. W. Hinchley said that the part of the paper which he liked best was that which dealt with the applications of the theories to actual practice. Chemical engineers were continually coming across cases in connection with which questions of surface tension, emulsification, frothing and so on had to be solved, and very often, being unable to deal with them from a fundamental point of view, as Professor Gibbs had dealt with such questions in his paper, they came to suitable solutions by trial and error. Professor Hinchley mentioned the experience of a firm concerned with the making of enamelled leather by the spraying of linseed oil with nitrocellulose, who had suddenly found that their goods were marked with microscopic spots, which proved to be particles of air, and were due to the spraying operations.

The firm in question, in order to hasten the drying of the material, had added more driers, and it was obvious that the soap in the driers had diminished the surface tension and had been responsible for the presence of the microscopic particles of air. The difficulty could be solved by increasing the drying period from one to two days, or by using a drier other than soap, or by reducing the amount of soap in the drier. As the result of halving the amount of soap used, the material was produced free from spots, but the surface was not so bright as was desired. By using a salt drier instead of a soap drier, however, or by reducing the amount of soap drier still further and substituting a quantity of salt drier, a bright surface was obtained. The solution of the difficulty was due to an appreciation of the fact that without surface tension a bright surfaced leather could not be made.

Mr. E. F. Greig, of the Safety in Mines Research Board, dealt with the wetting of coal dust ; Professor P. B. Haigh with the question of froth and its relation to the tensile strength of metals ; and Dr. L. A. Jordan with the importance of surface conditions to the pigment user and manufacturer.

British Chemical Overseas Trade for January

Increases in Exports and Imports

THE Board of Trade Returns for January state that imports of chemicals, drugs, dyes, and colours in January were valued at £1,533,188, an increase of £185,826 on January, 1928; exports were valued at £2,230,262, an increase of £156,101; and re-exports of imported merchandise at £66,599, a decrease of £6,051. Detailed figures are given below:—

Imports

	Quantities Month ended January 31, 1928.	Quantities Month ended January 31, 1929.	Value Month ended January 31, 1928.	Value Month ended January 31, 1929.
CHEMICAL MANUFACTURES AND PRODUCTS—			£	£
Acid Acetic .....tons	1,515	667	66,426	29,273
Acid Tartaric.....cwt.	518	2,918	2,669	19,598
BleachingMaterials ,,	18,497	17,054	12,167	14,704
Borax ..... ,,	10,013	7,801	8,342	6,415
Calcium Carbide .. ,,	99,501	108,688	56,270	65,594
Coal Tar Products, not elsewhere specified value	—	—	40,565	6,221
Glycerine, Crude...cwt.	410	120	1,414	274
Glycerine, Distilled. ,,	780	1,132	3,430	3,054
Red Lead and Orange Lead .....cwt.	4,383	3,907	6,704	5,364
Nickel Oxide ..... ,,	4	105	31	593
Potassium Nitrate (Saltpetre) .....cwt.	8,943	8,990	9,191	9,603
Other Potassium Compounds .....cwt.	495,900	350,124	121,309	98,576
Sodium Nitrate ... ,,	176,374	297,110	102,603	147,104
Other Sodium Compounds .....cwt.	40,922	47,665	31,414	35,6618
Tartar, Cream of... ,,	3,840	2,760	16,949	11,460
Zinc Oxide.....tons	869	1,248	27,805	37,610
Other Sorts .....value	—	—	321,514	319,540
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	49,892	150,042	3,901	10,800
Bark Cinchona (Bark Peruvian, etc.) cwt.	4,232	3,018	18,710	10,848
Other Sorts .....value	—	—	128,539	265,917
DYES AND DYESTUFFS, ETC.—				
Intermediate Coal Tar Products.....cwt.	288	15	2,738	198
Alizarine..... ,,	13	90	301	3,132
Indigo, Synthetic . ,,	—	—	—	—
Other Sorts ..... ,,	3,593	4,953	74,817	96,748
Cutch ..... ,,	2,247	4,418	3,743	7,071
Other Dyeing Extracts cwt.	4,106	2,199	10,590	7,758
Indigo, Natural.... ,,	90	71	2,100	1,895
Extracts for Tanning ,,	99,463	90,804	104,488	97,355
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground, and Blanc Fixe.....cwt.	49,584	76,353	11,296	16,128
White Lead (dry) . ,,	16,964	11,791	23,431	19,536
All other Sorts .... ,,	99,389	126,811	133,836	185,189
Total of Chemicals, Drugs, Dyes, and Colours .....value	—	—	1,347,362	1,533,188

Exports

CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Sulphuric ....cwt.	3,254	9,676	3,849	5,697
Acid Tartaric..... ,,	2,007	2,483	12,922	17,282
Ammonium Chloride (Muriate) .....tons	371	285	8,142	6,268
Ammonium Sulphate—				
To Spain and Canaries tons	438	15,875	4,268	156,969
,, Italy ..... ,,	715	620	7,183	5,734
,, Dutch East Indies tons	11,085	3,425	115,021	35,514
,, Japan ..... ,,	8,746	8,932	88,085	90,151
,, British West India Islands and British Guiana tons	411	539	4,169	5,287
,, Other Countries ,,	6,806	15,224	67,712	155,003
Total..... ,,	28,201	44,615	286,438	448,658
Bleaching Powder....cwt.	40,655	51,240	17,372	15,338
Coal Tar Products—				
Anthracene .....cwt.	1,005	—	419	—
Benzol and Toluol.galls.	121	6,012	13	602
Carbolic Acid.....cwt.	28,156	22,236	50,849	38,119
Naphtha .....galls.	8,856	8,469	1,031	792
Naphthalene (excluding Naphthalene Oil)cwt.	1,086	8,258	991	3,105
Tar Oil, Creosote Oil, etc. .....galls.	4,826,006	1,598,070	175,857	54,226
Other Sorts .....cwt.	49,042	23,063	26,919	18,193
Total....value	—	—	256,079	115,037
Copper, Sulphate of .tons	2,860	6,450	61,141	154,513
Disinfectants, Insecticides, etc. .....cwt.	36,013	33,800	88,320	84,719
Glycerine, Crude..... ,,	4,450	1,485	12,993	2,066
Glycerine, Distilled . ,,	11,743	5,763	47,611	16,238
Total.... ,,	16,193	7,248	60,604	18,304
Potassium Compounds—				
Chromate and Bi-chromate .....cwt.	2,120	2,396	3,908	4,414
Nitrate (Saltpetre) ,,	822	1,157	1,608	2,204
All other Sorts .... ,,	2,278	3,387	11,557	11,186
Total..... ,,	5,220	6,940	17,073	17,804
Sodium Compounds—				
Carbonate .....cwt.	474,782	382,259	138,226	117,110
Caustic ..... ,,	213,321	119,258	157,161	84,037
Chromate and Bi-chromate .....cwt.	2,746	7,061	3,915	9,760
Sulphate, including Salt Cake .....cwt.	71,768	100,237	8,857	10,620
All Other Sorts ... ,,	63,247	42,517	84,220	53,037
Total..... ,,	855,864	651,332	392,379	274,564
Zinc Oxide.....tons	59	121	2,662	4,988
Chemical Manufactures, etc., all other sorts value	—	—	260,005	310,665
Total of Chemical Manufactures and Products (other than Drugs and Dyestuffs) value	—	—	1,466,986	1,474,230
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	157,036	164,005	15,811	17,149
All other Sorts ...value	—	—	233,056	283,408
Total..... ,,	—	—	248,867	300,557
DYES AND DYESTUFFS—				
Products of Coal Tar cwt.	5,143	14,255	49,316	86,735
Other Sorts ..... ,,	7,113	10,175	6,445	11,857
Total..... ,,	12,256	24,430	55,761	98,592
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground, and Blanc Fixe.....cwt.	2,225	861	1,246	458
White Lead (dry) . ,,	4,093	4,629	7,438	9,147
Paints and Colours in paste form .....cwt.	53,576	52,318	106,212	104,540
Paints and Enamels Prepared .....cwt.	31,792	44,634	104,374	141,937
All other Sorts .... ,,	42,355	54,848	83,277	100,802
Total..... ,,	134,041	157,290	302,547	356,885
Total of Chemicals, Drugs, Dyes and Colours ...value	—	—	2,074,161	2,230,262

Re-Exports

	Quantities Month ended January 31, 1928.	Quantities Month ended January 31, 1929.	Value Month ended January 31, 1928.	Value Month ended January 31, 1929.
CHEMICAL MANUFACTURES AND PRODUCTS—			£	£
Acid Tartaric.....cwt.	52	73	409	595
Borax ..... ,,	116	545	118	531
Coal Tar Products value	—	—	343	16
Potassium Nitrate (Saltpetre).....cwt.	105	221	178	368
Sodium Nitrate.... ,,	115	144	65	81
Tartar, Cream of... ,,	323	550	1,471	2,039
All other Sorts ...value	—	—	22,798	12,079
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	16,123	20,388	1,828	2,187
Bark Cinchona ....cwt.	1,206	182	4,830	764
All other Sorts ...value	—	—	28,876	34,994
DYES AND DYESTUFFS—				
Cutch .....cwt.	803	2,168	1,219	3,416
Other Dyeing Extracts cwt	236	296	2,053	2,059
Indigo, Natural.... ,,	4	3	125	88
Extracts for Tanning ,,	425	1,315	577	1,774
PAINTERS' COLOURS AND MATERIALS.....cwt.	3,246	10,803	7,617	4,656
Total of Chemicals, Drugs, Dyes and Colours ...value	—	—	72,650	66,599

"I.G. Finance"—Position of Swiss Companies

To the Editor of THE CHEMICAL AGE.

SIR,—On page 116 of THE CHEMICAL AGE of February 9, under the heading "I.G. Finance," you make reference to the Internationale Gesellschaft für Chemische Unternehmungen of Basle. Our principals, the Society of Chemical Industry in Basle, Messrs. J. R. Geigy, S.A., and the Sandoz Chemical Works, instruct us to inform you that they are not interested either directly or indirectly in this new Swiss company and that there is no relation whatever between the three Basle firms enumerated and the Internationale Gesellschaft für Chemische Unternehmungen of Basle.—Yours, etc.,

THE CLAYTON ANILINE CO., LTD.

Manchester, February 12.

[Although no suggestion was contained in our notice that the Swiss companies named were involved in the Internationale Gesellschaft für Chemische Unternehmungen of Basle, we are glad to publish this official announcement that they are definitely not related to it.—ED., *C.A.*]

The Nitrate Situation

Sir Arthur Goldfinch's Optimism

THE head of the Chilean nitrate organisation in Europe, Sir Arthur Goldfinch, says, in an article in the *Chilean Review*, that the markets are slowly becoming accustomed to the new system of selling. Very large sales have been made in France, the largest ever recorded during the July-December period. It appears to be certain, he says, that the consumption of nitrate in Europe and Egypt this year will be considerably greater than last year, when it showed a very great advance on the previous unfavourable year. In France, Spain, Italy, and Egypt the 1928-29 figures will be the highest ever touched. The consumption will be excellent in Belgium, Holland, Scandinavia, Poland, and Czechoslovakia. In the United Kingdom and Germany some progress will be made in regaining the ground lost to sulphate of ammonia since 1914. There is, in his opinion, every reason to anticipate that, with the support now given to the industry, a steady progressive increase of consumption may be looked for year by year, an increase at least proportionate to the general expansion of the nitrogen market.

According to the Chilean Minister of Finance, the total production of nitrate during the seven months ended January, 1929, was 19,342,556 quintals, as compared with 12,877,086 quintals in the corresponding 1927-8 period; the total exports amounted to 18,926,419 quintals, as compared with 18,291,240 quintals in the corresponding 1927-8 period.

Society of Public Analysts

AN ordinary meeting of the Society of Public Analysts was held in the Chemical Society's Rooms, Burlington House, London, on Wednesday, February 6, the president, Mr. Edward Hinks, being in the chair.

Certificates were read for the first time in favour of F. Atkins, E. B. Bennion, J. Haslam, S. G. Kendrick, B. Jones, J. U. Lewin and L. John Walker; and for the second time in favour of W. B. Adam, A. L. Bacharach, A. Dargie and W. J. Itayim. The following were elected members of the Society: E. H. Bunce, F. O'Brien, W. M. Seaber and J. G. Sherratt.

Constituents of New Zealand Butters

"The Fatty Acids and Component Glycerides of Some New Zealand Butters," were the subject of a communication by Professor T. P. Hilditch and Eveline E. Jones. The procedure in the investigation consisted in oxidising the butter fat by means of permanganate under conditions in which all unsaturated components were transformed into acidic products, whilst glycerides containing only saturated fatty acids remained unaltered. These fatty acids were recovered and their composition determined by separating the lower fatty acids as completely as possible by distillation and refractionation, whilst the non-volatile acids were separated into groups by the lead salt and ether method followed by conversion of the acids from the soluble and insoluble lead salts into methyl esters, which were quantitatively fractionated by distillation at low pressure.

The approximate percentage composition of the butters examined was calculated to be as follows:—Mixed fatty saturated glycerides, about 30; mixed mono-oleo-disaturated glycerides, about 36; and mixed di-oleo-monosaturated glycerides, about 34 per cent.

New Test for Boric Acid and Borates

Mr. A. Scott Dodd discussed "A New Test for Boric Acid and Borates." The pink coloration produced by the addition of mannitol and methyl red or Sofnol indicator No. 1 to a neutral solution was characteristic of boric acid, a distinct reaction being obtained with as little as 0·2 mg. The only substances causing any interference with the distinctness of the reaction were phosphates, arsenates, chromates and tungstates, and in their presence it was difficult to ascertain the exact point of neutrality. Tungstates differed from all the other substances examined in giving a reddish-pink colour similar to that given by boric acid, but the reaction took place much more slowly than with boric acid.

Determinatoin of Small Quantities of Beryllium

"The Determination of Small Quantities of Beryllium in Rocks" was dealt with by Mr. B. E. Dixon. The chief obstacle to the accurate determination of small quantities of beryllium in silicate rocks was the difficulty of separating it from titanium. This difficulty had been overcome, said Mr. Dixon, by the use of *p*-chloroaniline, which would precipitate titanium completely, without causing any precipitation of beryllium. A method embodying this principle had been devised for the analysis of a silicate rock.

Spring Balances : Draft Merchandise Marks Order

A DRAFT order-in-council under the Merchandise Marks Act, covering, among other things, spring balances and copper plates, sheets, strips, rods, wire and tubes, was laid before Parliament on January 28. The part of the order dealing with spring balances is as follows:—

It shall not be lawful to sell or expose for sale in the United Kingdom any imported spring balance unless it bears an indication of origin. The indication of origin shall be cast or otherwise embossed, punched or otherwise incised or impressed, stencilled or otherwise painted or printed on the dial. Goods to which this part of this order applies shall bear the indication of origin therein provided on exposure for sale wholesale only if the person so exposing the goods is not a wholesale dealer. Nothing in this order shall require any goods to which this part applies to bear an indication of origin at the time of importation. This part of this order shall come into force at the expiration of three months from the date hereof. This order may be cited as the Merchandise Marks (Imported Goods) No. 1 Order, 1929.

Basic Industrial Minerals: IV.—Bauxite

By G. Malcolm Dyson, Ph.D., A.I.C.

In earlier articles in this series, Dr. G. M. Dyson has dealt with other materials of mineral origin, including barytes, mica, and graphite.

It is only slightly over a hundred years ago that the French geologist Berthier discovered that the so-called red clay of Les Baux (near Arles) was not clay at all, but was composed of a new mineral the composition of which was approximately 52 per cent. aluminium oxide, 27·6 per cent. ferric oxide, and 20·4 per cent. water. This new mineral received the name "bauxite" in honour of the place of its discovery, and has since been shewn to occur quite widely and to be a member of a very large series of minerals, the laterites. Enquiry shows that bauxite has been used for a considerable time in India as a building stone. The mineral as quarried is soft owing to the fact that it is considerably hydrated; in this condition it may be cut into the shape of bricks, and after drying in the sun these form excellent building material. The Indian name for bauxite has for centuries been "itica culla" (literally "brick-stone"). The Tamil name for bauxite "shuri cull" (literally "itch stone") is a reference to the curious appearance of deposits of bauxite which have been weathered; they resemble a common form of skin disease.

Occurrence

Nearly every country has its deposits of bauxite, although they are not all of equal value. At Bauxite in Arkansas there are several of the best American deposits, which are geologically similar to those of Little Rock in the same State. On the other hand, the deposits of South America, especially those of the Akyma district of the Demarara river basin in British Guiana, are entirely different, and are of the lateritic type. In the British Isles, bauxite occurs in Ireland among the intertrappean beds of Antrim, and a very good quality of bauxite is mined there for conversion to aluminium. From the geological standpoint, bauxite deposits are mainly pisolitic.

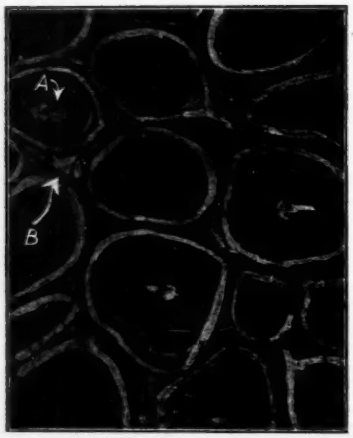


FIG. 1. SECTION OF A TYPICAL FERRUGINOUS PISOLITIC BAUXITE, UNDER NATURAL LIGHT, WITH CROSSED NICOLS. [FROM A PHOTOGRAPH BY FOX. MAGNIFICATION 50].

Fig. 1 shews the section of a typical ferruginous pisolitic bauxite, examined under natural light with crossed nicols and magnified 50 times. The pisolitic structure is shewn by the globular concretions, and the presence of foreign nuclei around which concretion took place, can be seen in two places, namely, at A, where the crystalline matter is intrapisolitic, and at B, where it is matricial. Bauxite appears to have been deposited as a semi-intrusion among other rocks, so that after the various strata have been folded, the bauxite deposits often present a complicated aspect.

In general, bauxite must be mined, although in certain of the American deposits it has been possible to quarry straight into a bauxite out-crop. The American deposits are usually more amenable to open-cut methods than any others, and in many cases it is quite a profitable proposition to remove about 10 ft. of overburden and so uncover the bauxite. One curious property shewn by bauxite deposits is the tendency to agglomeration. Many of the deposits which are mined at the present time have been formed by the agglomeration of "pebbles" of bauxite brought down from a higher level as detritus. Chemically, it is usual to regard bauxite as a hydrated aluminium oxide, in which part of the aluminium has been replaced by iron. Of course, silica and titanium oxide form almost invariably impurities in bauxite, but the extent of such contamination depends very largely upon the district from which the mineral has been obtained. Typical analyses of three representative deposits of bauxite are given in the following table:

ANALYSES OF BAUXITE

Constituents.	U.S.A. Arkansas.	Irish Glenrave.	W. African Kassa.
Silica	10·64	6·01	0·37
Titanium oxide	1·2	—	0·90
Alumina	57·46	61·89	57·2
Ferric oxide	2·5	1·96	7·41
Ferrous oxide	0·2	—	—
Water	28·0	27·8	33·71

The question as to the manner in which the water of bauxite is held has not yet been satisfactorily settled, but by most

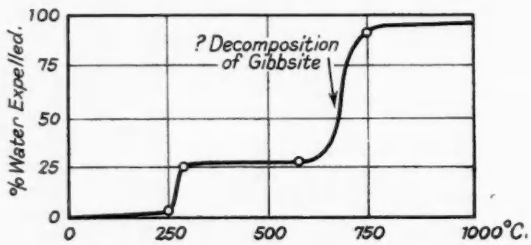


FIG. 2. TEMPERATURE-DEHYDRATION CURVE OF BAUXITE.

authorities it is thought that most of the water is present combined, and that one of the main constituents of the mineral is amorphous aluminium hydroxide, or amorphous gibbsite. This is rather well shewn by the temperature-dehydration curve of bauxite (Fig. 2), which shews that three parts of the water is evolved between 650° and 750° C. The dehydration point of crystalline gibbsite is between these two temperatures. The question of the water in bauxite is, of course, one of considerable economic importance. To economise on freight it is necessary to dry out the water, but care has to be taken that too high a temperature is not used, or there will be a serious decrease in the availability of the alumina, which is, after all, the most important factor of the mineral. As a general rule, the water is removed in automatic rotary kilns which are heated to 400–650° C. Originally, these kilns were fired by producer-gas, but it has recently been found that it is equally easy, and more profitable, to burn powdered coal with a forced draught.

Types of Bauxite

There are four rough divisions into which the natural bauxites may be separated for commercial purposes. Normal bauxite, which is the best quality, contains from 55–60 per cent. of aluminium oxide, and less than 20 per cent. of impurities (excluding water). Its iron oxide content should be less than 5 per cent. The second grade is the so-called white or siliceous bauxite, from which iron is almost absent. It contains, on the average, 55 per cent. of aluminium oxide, and from 5–20 per cent. of silica, and is usually chosen for the manufacture of alum and of refractories. Red bauxite contains a high percentage of iron (10–25 per cent.), together with about 50 per cent. of alumina and less than 5 per cent. of silica; this quality is in considerable demand for the manufacture of the metal aluminium. The fourth quality of bauxite is mainly an Indian product, but is attracting

considerable attention at the present moment on account of the 5–7 per cent. of titanium dioxide which it contains. This titaniferous bauxite contains about 55 per cent. of alumina and less than 5 per cent. of silica. The use of titanium dioxide as a white pigment makes the recovery of this substance during the purification of bauxite an attractive proposition.

Purification of Bauxite

Previous to calcination, it is often possible to separate from the crude bauxite a certain amount of clay, which appears to be present in the raw material invariably. This is usually effected by " peptisation " of the clay, a process which consists in the addition of a reagent such as caustic soda, which " peptises " the clay particles and allows them to be washed out from the particles of bauxite. This is, however, merely a preliminary process, and for most purposes it is necessary to subject the crude bauxite to a process of chemical purification. Many processes have been devised to accomplish this purification, and the subject is covered by a whole series of patents. In point of fact, only one method—the Bayer process—is used on a large scale, but there are one or two others which merit some mention. The first of these is the Serpek process, which attempted to combine the fixation of atmospheric nitrogen with the purification of bauxite. In essence the process depends on the following reaction :—

$$Al_2O_3 + N_2 + 3C = 2AlN + 3CO$$

This reaction, which is strongly endothermic, requires a temperature of over 1,400° C. to complete it, so that the mixture must be heated in an electric furnace. This at once introduces severe mechanical difficulties, which partly accounts for the lapse of this process into desuetude. In the actual process, a mixture of the crude bauxite with an excess of carbon is led through a rotary electric furnace heated to 1,600° C., the necessary nitrogen being passed up the shaft of the furnace as producer gas, which has been pre-heated so as to maintain the temperature of the furnace interior at a maximum. Crude aluminium nitride is extracted continuously from the bottom of the furnace, and crushed before being treated with sodium aluminate solution of 20° Bé strength. Decomposition of the nitride takes place giving ammonia and aluminium hydroxide, which dissolve in the caustic liquor bringing the gravity up to 40° Bé. The ammonia is led off and dealt with suitably, whilst the clear aluminate liquor is decanted and the alumina precipitated as in the Bayer process.

In the Deville-Pechiney process the powdered and calcined bauxite is ground in a ball mill with sufficient sodium carbonate to give the ratio $Al_2O_3:Na_2O = 1:1{\cdot}2$. This mixture is heated to the sintering point (1,200—1,400° C.) for a few hours, and then the sodium aluminate extracted by tipping the hot mixture into dilute sodium hydroxide solution at 80° C.

The Bayer Process

In this, the most important of the purification processes care must be taken that the raw material is not heated above 400 C. in the preliminary calcination. This means that some water will be retained, but the increase in the availability of the alumina compensates for any loss of freight occasioned by shipping the water. Briefly, the process involves the autoclaving of the bauxite with a caustic soda solution in order to form, in the first instance, soluble sodium aluminate. The ground ore is mixed with caustic soda solution of gravity 1·45, and in sufficient quantity to bring the ratio $Al_2O_3:Na_2O$ up to 102 : 110, which appears to be the most efficient point, about 95 per cent. of the total bauxite in the charge being extracted. The mixture is autoclaved at 7—8 atmospheres (180—220° C.), and after six hours, the charge is blown out by steam pressure into vats where hot washings from a previous batch are added until the total gravity is reduced to 1·23. This liquor is clarified by sedimentation and filtration, after which the precipitation of the alumina is effected by the addition of pure alumina from a previous batch. The alumina used is the product of a previous operation, and has not been allowed to dry during the interim period. It is stirred vigorously with the aluminate liquor until two thirds of the total alumina contained has been precipitated. Part of this precipitate is calcined to pure alumina, while the remainder is reserved for the next batch. Why the alumina should induce this precipitation is unknown. Other finely divided materials such as quartz dust or glass will effect precipitation, which seems to suggest that the solution is supersaturated, and that the provision of nuclei is all that is required.

Applications of Alumina

The greater part of purified alumina is used in the preparation of aluminium, and in the preparation of refractories. Thus, if alumina be heated to a high temperature, we get the various forms of fused alumina known under such proprietary names as " Alundum " or " Aloxite." The general properties of these refractories are sufficiently well known not to need enumeration here. From bauxite itself are made several valuable abrasives, and for this purpose the siliceous bauxite is used. If iron is present, a variety of emery is formed, whilst in the absence of iron corundum abrasives are obtained. The use of purified bauxite in petroleum refining is considerably on the increase : the passage of the crude material through a filter of bauxite not only clarifies the oil, but also desulphurises it in some measure. The exact type of purified bauxite used has a considerable effect on the extent of the purification, and the exact properties of the raw material which go to make the best purifying bauxite have not yet been determined with any certainty. It appears that the heat given out when a sample (500 g.) of the bauxite is mixed with kerosene (200 c.c.) is a rough measure of the purifying qualities.

A small amount of pure alumina is used for the manufacture of synthetic rubies and sapphires, which are fused alumina tinted with traces of various oxides. One of the more recent advances in the utilisation of alumina is the use of bauxite in the so-called " ciment fondu." It was first noticed in an Indian cement works that when (as a temporary measure) a siliceous lithomarge (a mineral akin to bauxite) was used, the cement set more rapidly and had a very good tensile strength. This observation developed into an industry using a mixture of bauxite, coke and limestone as raw material, which was fused with a little slag in a cupola and cooled and ground, giving the modern " ciment fondu." As an example of the improvement effected by this alteration it may be mentioned that 48 hours after mixing, the ciment fondu has a tensile strength of 59 kg., rising after 28 days to 71 kg. With a good quality Portland cement the strength is only 55 kg. after a period of 28 days. Although the price of the new cement is twice that of Portland cement, the saving effected in working costs more often than not compensates for this.

China Clay Exports, January, 1929

A RETURN showing the quantities and values of the exports of China Clay, including Cornish or China Stone, the produce of Great Britain and Northern Ireland, from Great Britain and Northern Ireland, as registered in the month of January, 1929, is as follows :—

COUNTRY OF DESTINATION.	QUANTITY. Tons.	VALUE. £
Finland	480	580
Sweden	1,975	4,432
Norway	2,157	3,010
Denmark	761	1,973
Germany	3,228	7,640
Netherlands	5,817	13,127
Belgium	6,330	11,596
France	7,618	15,415
Switzerland	110	284
Spain	272	900
Italy	1,939	4,188
Greece	59	149
Turkey, Asiatic	5	11
United States of America	20,962	48,193
Mexico	45	191
Peru	20	93
Argentine Republic	10	60
Irish Free State	6	5
Channel Islands	300	750
Union of South Africa (excl. Prot. of S.W. Africa)	1	9
Bombay via Other Ports	7,323	20,570
Madras	36	221
Bengal	394	1,367
Australia	4	39
Canada	153	143
Total	60,005	134,961

Drying Behaviour of Shales and Clays

Investigation at the U.S. Bureau of Standards

ONE of the investigations being conducted at the Columbus branch of the United States Bureau of Standards is concerned with the drying behaviour of several shales and clays of the glacial and alluvial type. A humidity dryer of semi-commercial size is used in this work. Water loss, shrinkage, and surface and centre temperatures are determined on three green brick of commercial dimensions, the brick being made with a small combination pug mill and brick machine.

Although the data are as yet not sufficient to warrant drawing positive conclusions, a number of interesting facts have developed. It was found that a commercial sized brick made by the Rutland (Ohio) alluvial clay could be made to lose about 76 per cent. of the added tempering water when dried at an average temperature of 26° C. and an average humidity of 94 per cent. for 244 hours. At this point an equilibrium appeared to be established. At no time was the temperature above 27° C. or the humidity below 92 per cent. The brick lost weight steadily at a temperature of 25.6° C. and a humidity of 97 per cent., even after it had already lost about 33 per cent. of the added tempering water.

The above is of interest in view of the fact that there is a rather prevalent opinion that clay ware will not dry out at such high humidities at this temperature range, but on the contrary will absorb water.

Alternate Humidifying and Drying

Maintaining the same temperature, the humidity was lowered to 85 per cent. and the brick again lost weight. After it had lost about 1 oz., the humidity was raised to 94 per cent., and the brick gained 0.5 oz. in weight and expanded 0.003 in. in 10 hours. The brick were dried at 105° C. for 15 hours, and again subjected to a humidity of 94 per cent. at a temperature of 26.7° C. Under this treatment the brick absorbed water to the extent of 3 oz. (about 4 per cent. of the dry weight) and expanded 0.011 in. in 69 hours. Thus, after about 75 per cent. of the tempering water has been evolved, the clay can be made to gain or lose water at will by varying the humidity or temperature. However, the clay only regained about 50 per cent. as much water at 94 per cent. humidity after being dried at 105° C. as it held when equilibrium had been attained at this humidity after the drying process had been carried on for about 244 hours.

Two facts of importance are to be noted here: first, the reabsorption of water on proper change of condition, and, secondly, the expansion which takes place coincidently. It is entirely possible that considerable dryer trouble might be traced to such change of conditions.

Shrinkage had practically ceased when about 75 per cent. of the tempering water had been eliminated, this being the time that the equilibrium had been attained apparently at 94 per cent. humidity. That is, this percentage possibly represents water present in a purely mechanical fashion But, inasmuch as the remaining 25 per cent. of water apparently exhibits equilibrium conditions at various humidities (temperature constant at about 26° C.), it is possible that this portion of the water is present in a definite absorbed or hydrate condition, each of the hydrates having its characteristic vapour pressure.

Shrinkage and Time of Drying

A further interesting fact is that the shrinkage varies with the length of time required to dry the brick to the end of the shrinkage period. In the table below, it is to be noted that the shrinkage of the Rutland alluvial clay is in every case greater, the greater the length of the drying time.

Drying Time, Hours	Total Shrinkage, In.	Shrinkage, Per Cent.
4	0·435	5·15
6	·450	5·42
8	·458	5·44
10	·469	5·56
12	·485	5·75
220	·522	6·23

From this it would appear that to state shrinkage correctly, the conditions under whch the drying takes place should also be stated.

Gas Light and Coke Co.

Low Temperature and Coke Oven Developments

PRESIDING on Friday, February 8, at the general meeting of the Gas Light and Coke Co., in London, Sir David Milne-Watson, the Governor, said that the company had pursued its policy of putting in modern plant at all its works whenever an opportunity had arisen. Within the last few years several of the works had been undergoing a process of renewal in order that the latest methods of carbonisation might be brought into use, and the reduction in the cost of manufacture had been noteworthy.

The low-temperature carbonisation plant at Richmond was approaching completion, and within a few days they hoped to be in a position to supply a smokeless fuel named "Gloco." Very many interesting questions arose out of low-temperature carbonisation, especially with regard to residuals. The company was carrying out investigations and research with a view to finding a new use for the tar and its constituents produced from this method of carbonisation.

Research

In the summer they opened a new central laboratory at their Fulham Gas Works. They in the Gas Light and Coke Co. were never more convinced than at the present time of the necessity for research, and they had now working at Fulham and elsewhere a highly efficient staff of chemists, who were studying the numerous problems connected with their work. Their central laboratory, working in conjunction with a full-scale experimental plant, had, as its especial object, fundamental research into the problems of their industry as apart from routine laboratory work. There were many problems connected with the nature and carbonisation of coal, and they felt that it was only right that a company such as theirs should take its part in the research work on coal, gas, and residuals which had such an important bearing at the present time on the welfare of the whole country.

Gas Making by Coke Ovens

They were considering the question of the installation of coke ovens at their Beckton Works. They had received tenders for this work, and were engaged in considering them, it had long been their desire to have a battery of coke ovens on their works, as they had reason to believe that from many points of view coke ovens were admirably suited for the production of gas and residuals. That showed that they, as a company, had no prejudice against coke ovens forming part of a gas works.

It had been assumed by a great number of people that there was antagonism between the gas industry and the coke oven industry. Nothing was really further from the case, because they regarded themselves as having shown the way to the by-product coke oven industry. When the coke oven industry was merely supplying coke for foundry purposes there was perhaps little connection between the two, but since the recovery of by-products there had naturally been greater community of interest between the two industries. Both industries, in his opinion, were part and parcel of one great industry, namely, that of the carbonisation of coal. They should try to work together, bearing in mind the special object of each industry, one being gas and the other coke, and so help to solve some of the great difficulties of the country, namely, the iron, steel, and coal problems. If both industries approached this question in a friendly manner, trying to understand one another's difficulties and not trying to "down" each other, a great deal of good would come to both industries and also to the country generally.

With regard to the company's income from residuals, Sir David said that there had been a fall in prices all round. That was only to be expected in view of the reductions which had taken place in the price of coal. Taken as a whole, however, a revenue of over £2,000,000 from residuals must in the circumstances be considered very satisfactory.

American Cyanamid Co.'s Acquisition

ACCORDING to arrangements just completed, the Calco Chemical Co. will be acquired by the American Cyanamid Co. The American Cyanamid Co. will give approximately 88,370 shares of class B common stock in a ratio of two and one-half shares of class B for each preferred share of the Calco company, and one share of class B common stock for each nine common Calco shares.

Coke Ovens at Templenewsam

Ministry of Health Inquiry

AN inquiry was held by the Ministry of Health on Friday and Saturday, February 8 and 9, into the circumstances attending the refusal of the Leeds Corporation to allow the erection of a coke oven plant near Templenewsam. The inquiry was the result of an appeal by the Viceroy of India (Lord Irwin), the lessor of mineral rights under the estate, and the Waterloo Main Colliery Co., Ltd., the lessees, who proposed to install a plant. Mr. H. P. MacMillan, K.C., and Mr. W. Stewart appeared on behalf of Lord Irwin, and on behalf of the colliery company. The Leeds Corporation were represented by Mr. W. J. Jeeves, K.C., and M. C. J. Frankland.

Opening the case on Friday, February 8, Mr. MacMillan said that in 1912 Lord Irwin granted to the colliery company a lease of a number of seams of coal around and under the Templenewsam estate, covering some 3,000 acres, and provision was made for the construction of coke ovens in connection with the working of the coal. When the Leeds Corporation acquired Templenewsam mansion and 917 acres of land on the estate in 1922, the conveyance was subject to the lease of the mineral rights, and the Corporation were aware that the whole of the minerals had been let, and that the lease contained provision for the construction of coke ovens as part of the scheme for working the coal. A subsequent conveyance of 18 acres to the Corporation was also made, subject to the mining lease.

Proposed Purchase of Gas by the Corporation

The next stage, said Mr. MacMillan, was a letter from the colliery company to the chairman of the Leeds Corporation Gas Committee, enclosing a plan showing the site on which it was proposed to erect the coke ovens, and also the roads leading from the site to the Corporation gas works in the city. The Corporation proposed that they should enter into a contract with the colliery company for the sale by the latter of the gas generated at the coke ovens, and in a letter of October 12, 1923, the Corporation said they expected that the quantity of gas coming from this source would be 1½ to 2 million cubic feet per day, and they thought it should be available at about the end of 1924. In 1924 a town planning inquiry was held, and shortly afterwards negotiations were entered upon for the purchase by the company of the site for the coke ovens.

In the town planning scheme, which was approved by the Ministry of Health in October, 1925, the area which the colliery company had contemplated for the erection of the coke ovens was marked for playing fields, whilst to the west of this area a large area, where the present proposed site of the coke ovens was, was designated in the scheme for industrial purposes. The Corporation had laid down that certain industrial buildings should be approved by them before construction. Until January, 1927, the colliery company had not been aware that there was a town planning scheme, with a provision that certain buildings must be approved by the Corporation. In the following November a re-zoning of the area was advertised, and everything appeared to be settled. The Corporation, being fully alive to the proposed utilisation of land for coke oven purposes, had done everything in their power to assist the company, and had entered into a contract on the basis that the ovens were to be erected. Then, in January, 1928, there was a complete volte-face, and the colliery company were informed that objection had been taken to the proposal, and that the City Council had referred the matter back. In the following month the Town Clerk had to write that the Improvements Committee had decided not to proceed with the proposal. This was endorsed by the Council on March 7.

Mr. MacMillan continued that the next step was to demand that the company should supply, within the next twelve months, gas from the ovens which they had been prevented from erecting. On March 28, so enthusiastic were the Gas Department that the manager wrote asking the company to say when the Corporation could proceed with the laying of the main from the compressing plant to the gas works. In May the Town Clerk was invoked. It had become a case for the legal department. The Town Clerk wrote that the matter had been considered by the Gas Committee, who instructed him to require the company to supply the gas within twelve months, failing which the contract would be cancelled.

Claims for the Plant

Mr. J. H. Brown, managing director of Simon-Carves, Ltd., gave evidence regarding the plant which his firm proposed to erect for the Waterloo Main Colliery Co. He said that the sulphuretted hydrogen would be left in the gas, to be taken out at the gasworks. With good management of the plant emission of noxious chemicals would be so small that he doubted whether a chemist, employing the most scientific methods, would be able to trace it at Templenewsam. Cross-examined by Mr. Jeeves, Mr. Brown said that the complete plant had not been tried in this country, and he agreed that there was nothing on the plan to indicate the strength of their claims. He was prepared to submit plans which would, to anyone with sufficient knowledge, substantiate those claims.

Giving evidence on Saturday, February 9, Mr. J. Milner, chairman of the Leeds Improvements Committee, said that the committee would have been glad to hear from Simon-Carves details of the proposed plant, but there had been nothing before them to suggest that the effect of the plant would be different from that in other places.

Evidence was also given by Dr. J. J. Jervis, Medical Officer of Health for Leeds, and Dr. A. G. Ruston, Lecturer on Agricultural Economics in the University of Leeds.

Views of the Corporation

Mr. Jeeves, addressing the Inspector on behalf of the Corporation, said that a certain amount of play had been made by Mr. MacMillan on the fact that the Corporation had changed their minds, having first been inclined to encourage the erection of the plant, but he submitted that it required a strong man and a strong body to admit having made a mistake, and the very fact accentuated the strength of the feeling of the City Council. It was better that when a mistake had been made it should be recognised. At that inquiry the claim had been put before the Corporation, for the first time, that the proposed plant would very largely meet many of the objections that had been raised against coke ovens in the past. Whether those claims were good or not was a matter which it would be well for the Ministry to investigate before coming to a decision regarding that appeal. They would welcome such an inquiry by the Ministry, and if it were rightly found that these works could be erected with safety to the surrounding area, he did not think that anyone would more welcome that than the Corporation of Leeds; because it was only because of the state of information up to date that they were convinced that there must be detriment to the countryside, and that they had refused consent. Referring to the agreement to take gas from the plant, Mr. Jeeves said that if the coke ovens were erected in the near future the Corporation were perfectly prepared to implement that agreement to the full measure which had been undertaken.

Barrenechea Nitrate: Sale of the Property

AN extraordinary meeting of the Barrenchea Nitrate Co., Ltd., was held on Wednesday, February 6, Mr. R. E. Morris (chairman) presiding. The secretary having read the notice convening the meeting, the chairman said that there was some delay in the transfer of the property owing to an alteration in the purchaser's programme; but no time was lost on the company's part either here or on the other side in the completion of the necessary formalities of the sale. As advised in the circular dated January 25, 1929, the property had been transferred to Senor Benito Rojo Lopez, and the purchase consideration of £25,000 had been received. They were informed by their agents in Iquique that the Chilean Government was demanding certain so-called arrears of taxes. That claim would be opposed, and notice of the appeal had been lodged. Before that step could be taken, however, a sum of £750 had been deposited in the court. That action would delay the complete distribution of the assets, and if the money had to be paid would lessen the amount available. Upon the liquidators' appointment, however, it was anticipated that, having settled all other liabilities, he would be able to make an immediate payment on account of not less than 13s. 6d. per share. The chairman moved that the company be wound up voluntarily and that Mr. W. J. Welch, of 27, Leadenhall Street, E.C.3, be appointed liquidator for the purposes of such winding up. Mr. Edward Eyre having seconded the resolution the meeting terminated.

Engineering in Chemical Industry

Fire Risks in Chemical Works

A MEETING of the Manchester Association of Engineers was held on Friday, February 8, when Mr. C. E. S. Place read a paper on "Engineering in the Chemical Industry." Mr. G. Gass presided.

Storage of Acids

Mr. Place said that the supply of acids for various purposes presented many interesting features. If the acids were not actually supplied from within the works, then the general practice was to supply in either rail tank wagons or by carboy. In some cases these cylindrical tanks, which were secured to rail wagons, were of mild steel shell, and were fitted with suitable connections for either discharging their contents by means of compressed air or alternatively by pump. For certain acids these tanks were suitably lined within with materials such as ebonite, etc., these linings being necessary to withstand the action of the particular acid transhipped. The works storage arrangements in a modern factory presented the minimum amount of handling inasmuch that the storage vessels were permanently fixed upon suitable weighing machine equipment, so that at a later date definite quantities might be measured and pumped to definite plants with maximum ease. One particular acid, HCl, required special care in handling and one method of storage was in stoneware receivers, delivery to and distribution from the receivers being carried out through ebonite pipe lines and pumps made entirely of ebonite.

Rubber Linings

An interesting development in connection with the treatment of acids, from the point of view of storage and treatment at later stages during process manufacture, occurred in the marketing of a special preparation of compounded milled rubber which began to cure at a temperature of approximately 80° C. and which enabled vessels to be lined with rubber on the job. This preparation could be applied to all kinds of surfaces, even when in a bad condition. Mild steel cylindrical storage vessels, wooden vats, wooden filters, etc. could be suitably treated. It was also claimed that cracked or broken earthenware vessels could be effectively treated. The author understood that meters for measuring acids, valves, pumps, etc. could be procured in this material. Needless to say, this preparation had a wide field in the engineering world independent of its utilisation for chemical works.

Chemical Extinguishers

It was a surprising fact, Mr. Place remarked, that although fire risks were so high in the average chemical works, up to recently certain factories coming under review had been far from satisfactorily protected. All water service supplies, whether from external sources or from wells enclosed within the factory boundary, should be fed into a common main, fitted with suitable departmental branches, so arranged that by perfect ease of valve manipulation the full supply might be directed to any point at a moment's notice. It was of interest to note the very definite advantages gained by the use of the "foam" or "snow" type of extinguisher which was daily being brought into a bigger field of application in the chemical factory, and in the near future should more or less reduce the use of water—"except as a medium for its own production"—in the case of chemical fires.

Forthcoming North-East Coast Exhibition

UNDER the patronage of the King, the North-East Coast Exhibition of Industry, Science and Art will be held at Newcastle from May to October. The Exhibition will occupy an area of about 100 acres at Town Moor, and special buildings are being erected for the display of exhibits. The Exhibition will be an essentially British one, and exhibits are being invited from manufacturers and others in all parts of Great Britain and the Overseas Dominions. Among the exhibits will be sections dealing with the chemical industries; coal and metalliferous mining and products; and science and education, as well as numerous others. Applications for further information concerning the exhibition should be addressed to Mr. C. P. Hainsworth, General Manager, Exhibition Offices, Pearl Buildings, Northumberland Street, Newcastle-upon-Tyne.

Waste Food Products Developments

Increase of Capital Proposed

THE directors of Waste Food Products, Ltd., state in a circular that as the company has been able to place itself in a position to procure adequate supplies of raw materials, they have decided upon a second unit at Stanwell. This is now nearing completion, and both units should next month be in full operation, and be earning profits at the rate of about £100,000 per annum. The "Matusa" Works, Beckton Road, London, E., are estimated to be earning profits of £5,000 per annum, which should be increased to about £17,000 when the proposed plant for dealing with 25 tons of fish per day has been installed. In South-West England the directors have entered into long-term contracts for supplies of fresh waste fish and fish offal, and have decided to erect a central unit for production of fish oils and meals. It is confidently anticipated that substantial profits will accrue from this unit, which should be operating within four months after commencement of its erection.

Negotiations for Extension of Business

The directors have also been actively carrying on negotiations with a view to the extension of the business in other parts of the country, but they do not deem it advisable at this moment to give any exact particulars. The directors have agreed to purchase the business of Mr. G. C. Russell, of 6, Cowcross Street, London, one of the largest collectors of waste bones and fats in Smithfield Market. This business has a factory at Hounlsow, and with the company's methods further profits of about £20,000 per annum should accrue.

To finance the second unit of plant, and the other arrangements and contracts which were not contemplated at the time of the prospectus, the board propose to increase the capital to £400,000 by 250,000 further ordinary shares of £1 each. It is not proposed to issue the whole of these shares immediately, but the chairman hopes at the meeting to inform the shareholders of the proposals with regard to an issue of part of these shares, for which the holders of ordinary shares will, in the first instance, have priority of allotment. A meeting is called for three o'clock on Monday, February 18, at Winchester House, London.

Chemical Society's Visit to Leeds

THE Council of the Chemical Society has decided that the 88th annual general meeting and the anniversary dinner of the Society shall take place in Leeds on Thursday, March 21. It is the desire of the Council to make these meetings a special occasion for a general gathering of chemists and those associated with chemistry in the North of England, and in order that they may be representative of all branches of chemistry and chemical industry, the affiliated societies and a number of industrial organisations have been invited and have agreed to co-operate. A general committee has been formed with Mr. H. S. Patterson (The University, Leeds), as hon. secretary.

The annual general meeting will be held in the University of Leeds on Thursday. The business portion of the meeting (open to Fellows only) will be held in the Chemistry Lecture Theatre at 3.15 p.m. The presidential address, entitled "Co-operation in Science and Industry," will be delivered by Professor J. F. Thorpe, in the Great Hall of the University at 4.30 p.m.

The anniversary dinner will take place the same evening at 7 for 7.15 p.m. in the Town Hall, Leeds, and the Council is gratified to state that the Society is to be honoured by the presence of Viscount Lascelles, as the principal guest of the evening. Applications for tickets (12s. 6d. each) should be sent direct to Mr. S. E. Carr, The Chemical Society, Burlington House, Piccadilly, London, W.1, accompanied by remittance.

The directors of the British Dyestuffs Corporation, Ltd., have kindly invited a limited number of Fellows and others attending the meetings of the Society on March 21 to visit their works and laboratories at Huddersfield on Friday morning, March 22, 1929. Those desiring to avail themselves of this privilege should inform Mr. H. S. Patterson (The University, Leeds) of their intention before March 19, 1929.

The Railway Clearing House has granted facilities by which those attending the meetings on March 21 will be able to travel from all parts of the country to Leeds at the reduced rate of an ordinary fare and one-third for the double journey, provided that not less than 100 persons avail themselves of this privilege.

Chemical Notes from Westminster

Questions in the House

The Gallery, Westminster.

MR. WEDGWOOD BENN, in view of the recent attention to the importance and also to the scarcity of radium, questioned the Financial Secretary to the Treasury (February 11) whether radium and radium compounds are at present subject to an import duty and, if so, at what rate. Mr. Samuel's reply was that the item "radium compounds" is included in the official list of chemicals liable to a duty of 33⅓ per cent., *ad valorem*, under Part I of the Safeguarding Act of 1921, but that these compounds are exempted from duty until June 30 next by Treasury order. Radium, he added, is not dealt with commercially except in the form of a compound. Mr. Benn's inquiry will probably help to secure a further exemption.

Mr. Kelly (February 11) elicited an interesting reply from the Ministry of Labour respecting the number of men and women engaged in the drug and fine chemical and the heavy chemical trades. Separate statistics, said Mr. Betterton, of the number of insured persons in the "fine" and the "heavy" branches are not available, but the estimated number of insured persons in Great Britain, aged 16 to 64 years, classified under the chemical industry at July, 1928, was :—

Men	73,910
Boys	3,540
Women	18,840
Girls	3,460
Total	99,750

Mr. Hacking, representing the Board of Trade, was unable to inform the same questioner how many companies registered under the Companies Acts are engaged in chemical manufacture.

The alarm which is beginning to be felt by the civil population at the possibility of gas warfare and at the suggestions of its devastating character was expressed in a question (February 13) put by Mr. R. Morrison to the Prime Minister as to whether any scheme would be issued to local authorities and others concerned for the protection of town populations from chemical gases in future warfare, providing for gas-proof rooms, flushing of streets with appropriate chemicals, decontaminating clothing, and providing first-aid and removals to hospital, and what steps are being taken to provide the necessary preliminary training in such matters. Mr. Baldwin's reply was a perfect Parliamentary formula. The problem of the protection of the civil population against gas attack, he said, is being closely studied in all its aspects, and the need for the preliminary training of personnel, etc., is not being overlooked. The sort of answer that should completely reassure the nervous!

The most that Mr. Shinwell could obtain from the Admiralty, in reply to his questions respecting the larger use of Scottish shale oil in the navy, was that the only reason why the Admiralty does not buy Scottish shale oil is that it is too expensive. Why, was Mr. Shinwell's sarcastic retort, do the Government advocate the purchase of British goods when they themselves will not purchase Scottish shale oil? Is price, he continued triumphantly, to be considered when you are advocating the purchase of British goods?

Factory inspectors, Sir W. Joynson-Hicks told Mr. Adamson, in reply to an inquiry respecting the discharge of noxious fumes from factories, are only empowered to take steps for the protection of persons employed within the factories, but the Alkali Works Regulation Act contains powers for preventing the discharge into the air of noxious or offensive gases and these powers are administered by the Minister of Health.

Public inquiries into the present position of the Dead Sea Salts Concession have been advanced a stage by a question addressed to Mr. Amery by Captain Cazalet. The Colonial Secretary disclosed the interesting fact that he has now received the reply of the Trans-Jordan Government on certain points of detail in connection with the draft concession, and is considering it. No contract, however, has yet been executed.

Further questions on the same subject were put in the House of Commons (February 11), by Colonel Howard-Bury, who desired to know by what authority Mr. Novomeysky, one of the provisional concessionaires, carried out investigations on the Dead Sea *in situ* when the British group was repeatedly informed by H.M. Government that no investigations whatsoever could be carried out *in situ* until peace with Turkey had been signed and ratified. Mr. Amery's reply was that Mr. Novomeysky was working in Palestine on the question of the extraction of salts from the Dead Sea as far back as 1911. He returned to Palestine and took up his residence there in 1920. The Colonial Secretary was not aware whether he then renewed his investigations or obtained permission to do so from the Palestine Government. The decision in principle to grant the concession to Major Tulloch and Mr. Novomeysky was not based on considerations of priority, either of application or of investigation. Questioned by Mr. Crawfurd on the point whether the concessionaires were a "non-British group," Mr. Amery stated that one of the principal promoters is Major Tulloch, a British subject, and his impression was that there were other British subjects.

A delightful reply was given by Mr. Churchill in the House of Commons (February 7) to an inquiry by Mr. Harris respecting the number of Custom House officials on December 31, 1923, and December 31, 1928. Comparing these two years, the number has increased from 11,314 to 12,069. When Mr. Harris asked, "Is that due to increased work in collecting Safeguarding Duties," the Chancellor's lighthearted reply was: "Yes, it is another form of the increased employment that is afforded by them"—at, he might have added, the public expense.

Dr. Freeth on Research

DR. F. A. FREETH, F.R.S., of I.C.I., addressed a well-attended Bedson Club lecture in Armstrong College, Newcastle, recently, on "Research and Team Work." This country, he said, was advancing in scientific and research work, and he hoped that sufficient encouragement would be given. The tremendous development in the chemical industry of late years pointed the way. He made a strong plea for people of wealth to give generously towards endowing travelling scholarships so that professors and lecturers could enjoy a three months' educational tour in Europe. Team work in research could either be a magnificent thing or a positive menace. In this country they were almost sport hypnotised, and a man who had the courage to protest against team spirit was regarded almost as an outcast. When he protested against the team spirit he was not protesting against intellectual co-operation, but against the mechanical nature of the team spirit, which could develop into a real danger.

Mond Nickel Co. Meeting

AN extraordinary general meeting of the Mond Nickel Co., Ltd., was held on Tuesday, at the Central Hall, Westminster, under the presidency of Mr. D. Owen Evans, at which the resolution passed at the meeting on January 28 last, altering the articles of association, was unanimously confirmed. The chairman stated that the proposed alterations were a necessary formality in order that the exchange of the shares in the Mond Nickel Co. for stock in the International Nickel Co. of Canada, Ltd., might be carried through.

New Yorkshire Low Temperature Undertaking

THE establishment of a second undertaking in the Doncaster colliery area for the extraction of crude oil by means of low temperature carbonisation of coal is contemplated at Thorne Moorends. The other is being built at Askern. A site of 40 acres near Thorne Colliery has been purchased, and it is expected that the erection of the plant will proceed without delay. When finished it is expected that 100 hands will be employed. The Thorne proposal is not associated with the one at Askern.

From Week to Week

A TARMAC FACTORY situated on the harbourside, North Quay, Newhaven, was destroyed by fire on Tuesday.

SULZER BROTHERS, of 31, Bedford Square, London, announce that their telephone number has been changed to Museum 0702 (4 lines).

MR. EDWARD T. ELBOURNE states that he has removed his offices from 8, Great St. Helens, E.C.3, to Equitable House, 47/51, King William Street, London, E.C.4.

AT THE ANNUAL MEETING of Bemberg Artificial Silk Co., in Berlin on Monday, it was announced that the company had decided to establish British Bemberg, Ltd., in England, in connection with which a factory is to be erected at Doncaster.

IT IS REPORTED that a 40-acre site has been acquired by a Leicestershire firm for the erection near Thorne Colliery, Yorkshire, of low-temperature carbonisation works. It is intended to use local coal of low grade for which there is at present a poor market.

CHILEAN NITRATE OF SODA DISTRIBUTORS, LTD., of London, have established representatives of the same name at Hamburg. The chairman is J. J. P. Wirtz, other members being G. W. Koock and G. W. Justus.

NOTICE IS GIVEN in the *London Gazette* that a petition has been presented by Dr. Ernst Johannes Hartung (Melbourne), president of the Australian Chemical Institute, and others, praying for the grant of a Charter of Incorporation to the Institute. All petitions for or against such grant should be delivered at the Privy Council Office on or before March 12.

THE PETROLEUM DEPARTMENT of the Board of Trade has been transferred to the offices of the Mines Department, Dean Stanley Street, Westminster. Mr. H. W. Cole, has been appointed director of the Petroleum Department in succession to Mr. J. J. Wills, now Comptroller of the Companies Department. Mr. Cole will continue to hold his present post of Assistant Under-Secretary for Mines.

MR. J. Y. MURDOCH, president of the Noranda Mines, Ltd., Canada, announces that an application has been made for the incorporation of a new company in which the British Metal Corporation, of England, and the Nicholas Copper Co., of New York, will be associated with Noranda Mines, Ltd. The object of the new group is the construction of a Customs copper refinery in Eastern Canada.

LORD MELCHETT, Sir Harry McGowan and the directors of Imperial Chemical Industries, Ltd., have issued invitations for a press inspection of the new offices of the company at Imperial Chemical House, Millbank, London, on Friday morning, February 22. The party will be conducted over the building by the officials and the architect, and a film illustrating the construction of the building will be shown.

ONE MAN WAS KILLED and five persons were injured in an explosion, on Tuesday, at the copper works of Thomas Fildes, Thornton Street, Collyhurst, Manchester. Apparatus used for generating acetylene for welding purposes was frozen up, and the men were trying to thaw it with warm metal plates. This method seemed to have little effect, and the generator was being dismantled when it exploded.

A NEW SAFETY GLASS which, it is claimed, is not only non-splinterable but non-discolourable and non-inflammable, has been patented by Xetal Safety Glass, Ltd., of Stapleford, Notts. Tests at Faraday House Testing Laboratories have been made of the new glass. Subjected to a powerful mercury vapour lamp for twenty-four hours it showed no discoloration. When service revolver bullets were fired at the glass at distances of ten and twenty-five yards the glass was pulverised to a depth of $\frac{1}{32}$ of an inch only.

SIR MALCOLM DELEVINGNE, of the Home Office, gave an account of the illicit drug traffic before the League of Nations Parliamentary Committee, in the House of Commons, on Monday. He said that the entry into force of the Geneva Opium Convention in the latter part of last year might be expected to lead to valuable results. He admitted, however, that the value of the Convention was limited by the fact that so far only about half the members of the League had ratified it, and not all could be counted on to administer it efficiently.

THE ANNUAL DINNER which the old Students Association of Finsbury Technical College are organising for Friday, March 1, at the Trocadero Restaurant, London, will this year have a special interest. The dinner will celebrate the jubilee of the opening of Finsbury College, and an effort is being made to secure a representative attendance of old F.T.C. men. Application for tickets (12s. 6d.) may be addressed to the hon. secretary, Mr. F. R. C. Rouse, 15, Clifton Gardens, Golders Green, London, N.W.11. The chair at the dinner will be taken by Mr. E. W. Moss, president of the Association.

MR. THOMAS A. EDISON is said to have been working on a latex from which a useful rubber substitute can be produced. The latex is obtained from a perennial weed.

DR. R. A. MILLIKAN, the Messel Lecturer for last year, has been elected president of the American Association for the Advancement of Science in succession to Dr. H. F. Osborn.

MR. E. KILBURN SCOTT, of London, and a native of Leeds, who is well known in chemical and engineering circles, has been adopted as prospective Liberal candidate for South Leeds.

FIVE WORKMEN were killed in an explosion on February 7 at an explosives factory at Gegni, on the Rome-Naples line. Part of the factory was demolished and windows in houses in the vicinity were shattered.

MR. ROBERT C. STANLEY, president of the International Nickel Co. of Canada, Ltd., Mr. J. L. Agnew, vice president, and Mr. John Foster Dulles, director and counsel have arrived in London from America for consultation with Lord Melchett upon the nickel merger and the future working of the two companies.

SODIUM PEROXIDE is produced in Japan by three firms, the Nippon Soda K.K., the Hodogaya Soda K.K., and Tojo Soda K.K. (the two latter working together). The total production is 11,000 lb. per day. The two latter companies are said to obtain their raw material in England.

A SOLVENT RECOVERY PLANT, which will eventually be one of the largest in Europe, is being installed at the British Acetate Silk Works at Stowmarket by the British Carbo Union, Ltd. The plant will be used for recovering acetone, thus effecting considerable savings in the cost of producing artificial silk. It is understood that this process is already worked by the I.G. at Leverkusen.

A SYMPOSIUM ON CORROSION will be one of the features of the annual meeting of the American Institute of Metallurgical and Mining Engineers, which will take place in the period February 18-21, in New York. Mr. U. R. Evans, of the University of Cambridge, will give an address on "The passivity of metals and its relationship to problems of corrosion."

A NEW COMPANY for the production of synthetic nitrogen compounds has been organised in Czechoslovakia under the name of the Synthesia Chemical Works. The plant will be located at Semtin, near Pardubice, where the works of the Czechoslovakia Explosives Co. are also situated. The officers and directors of the two companies are almost identical.

NEGOTIATIONS for the purchase of the site of a research station for the fishing industry, in Aberdeen, have been concluded by the Department of Scientific and Industrial Research. The site, at Abbey Road, Torry, was obtained from the Town Council. The details of the work to be carried on at the station were given in the parliamentary news in last week's issue of THE CHEMICAL AGE.

BABCOCK AND WILCOX, LTD., and the Krakau engineering works of L. Lieleniewski and Fitzner Gamper A.G., are reported to have come to an agreement for the establishment of a company under Polish law under the joint control of the two firms. The new company will take in lease the engineering works of the Polish firm at Sosnovice, and will transform it for the manufacture of boilers.

BORAX CONSOLIDATED state in their report for the year ended September 30, 1928, that the reason for a reduction in profit from £320,738 to £307,188, is continued active competition from the United States. As the result of the competition referred to, the average prices of the company's products were the lowest recorded. Some assistance in meeting these conditions, however, was provided by the development of the new boron mineral Rasorite, referred to a year ago, which has enabled a substantial saving to be effected.

DR. J. A. V. BUTLER, lecturer in physical chemistry in the University of Edinburgh, has been awarded the Meldola Medal of the Institute of Chemistry for his published work on the modern theory of conducting solutions. The Meldola Medal is awarded annually to the chemist whose published chemical work shows the most promise, and is brought to the notice of the administrators during the year ending December 31, prior to the award. The recipient must be a British subject of not more than thirty years of age at the time of the completion of the work.

Obituary

MR. GEORGE WATSON GRAY, F.I.C., analytical and consulting chemist, at Garston, Liverpool, on February 12.

MR. THOMAS PORTER BLUNT, F.I.C., aged 86, on February 9, at Shrewsbury. For over 50 years he was county analyst for Shropshire and he also acted as county analyst for Merioneth and Montgomery. He was one of the pioneers of sun-ray treatment and conducted some of the earliest experiments in determining the nature and value of ultra-violet rays.

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British

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The biological inertness of irradiated mycosterols other than ergosterol. O. Rosenheim and T. A. Webster. *Biochem. J.*, Vol. XXII, No. 6, pp. 1426–1428. A mycosterol, accompanying ergosterol in ergot, was isolated, for which Tanret's name "fungisterol" is retained. This, as well as two other sterols from the same source, was found to be biologically inactive after irradiation. The results confirm the evidence previously adduced for the unique function of ergosterol as the mother substance of vitamin-D.

United States

GENERAL.—Nitrocellulose diffusion experiments. R. O. Herzog and D. Krüger. *J. Phys. Chem.*, February, pp. 178–189. Diffusion experiments with nitrocellulose in different solvents are described.

Solubility of calcium hydroxide. L. B. Miller and J. C. Witt. *J. Phys. Chem.*, February, pp. 285–289.

RUBBER.—The absorption of oxygen by rubber. G. T. Kohman. *J. Phys. Chem.*, February, pp. 226–243. In order to determine the relation between natural ageing and oxygen absorption at 80°C., the effects upon oxygen absorption of a number of factors which are known to affect natural ageing have been studied. A piece of apparatus is described with which it is possible to follow the absorption of oxygen at constant pressure, temperature, etc., over long periods of time.

TEXTILES.—Electrical conduction in textiles. II.—Alternating current conduction in cotton and silk. E. J. Murphy. *J. Phys. Chem.*, February 4, pp. 200–215. The equivalent parallel capacity and conductivity of cotton and silk were determined as functions of humidity, amount of electrolytic material in the samples, and frequency (in the telephonic range).

VITAMINS.—Comparison of the antirachitic potency of ergosterol irradiated by ultra-violet light and by exposure to cathode rays. A. Knudson and C. H. Moore. *J. Biol. Chem.*, January, pp. 49–64. Ergosterol exposed to cathode rays (180,000-200,000 volts) is not rendered as potent as when irradiated with ultra-violet light from a mercury vapour quartz lamp. Ergosterol exposed to ultra-violet light for 15 seconds is more potent than when exposed for 30 minutes. The manner in which cathode rays produce their antirachitic action does not seem to be due to the production of ultra-violet light.

German

ANALYSIS.—A method for the quantitative determination of organic arsonic acids. E. Urbschat. *Biochem. Zeitschrift*, Vol. 203, pp. 223–225.

A new universal apparatus for microanalysis. I.—Ashing in a closed system. E. Tschopp. *Biochem. Zeitschrift*, Vol. 203, pp. 267–277.

A method for the quantitative determination of small quantities of silicic acid in orthophosphoric acid. P. Albrecht. *Chemiker-Zeitung*, February 9, pp. 118–119.

APPARATUS.—Experiments with filtering crucibles with porous bottoms. S. Gericke. *Chemiker-Zeitung*, February 9, p. 119.

ARTIFICIAL SILK.—The molecular structure of artificial silk. A. Rosenzweig. *Kunstseide*, January, pp. 11–13.

FATS.—The method of investigation and identification of fats and mixtures of fats. II.—Turbidity-point and solidification curves. B. Lustig and G. Botstiber. *Biochem. Zeitschrift*, Vol. 204, Parts 1–3, pp. 46–61.

GENERAL.—The reactions between iron, its hydroxides, and water. G. Schikorr. *Zeitschrift Elektrochem.*, February, pp. 65–70.

The electrolytic preparation of hydroxylamine. The products of the reduction of nitric acid at mercury, lead, and copper cathodes. J. G. Stcherbakow and D. M. Libina. *Zeitschrift Elektrochem.*, February, pp. 70–83.

PLANT.—Centrifuges for the chemical industry. C. Schmitz. *Chemische Fabrik*, February 6, pp. 63–65.

Suction valves for the acid industry. J. Benz. *Chemische Fabrik*, February 6, pp. 65–66. A new type of suction valve construction of very acid-resistant silicon iron.

VITAMINS.—Contribution to the question of the homogeneity of vitamin-B. E. Schmitz and E. George. *Biochem. Zeitschrift*, Vol. 204, Parts 1–3, pp. 165–178.

The vitamin-A action of lipochromes (carotinoids). B. von Euler, H. von Euler, and H. Hellstrom. *Biochem. Zeitschrift*, Vol. 203, pp. 370–384. The colorimetric test of vitamin-A with antimony chloride and chloroform is given by pure carotin and pure lycopin, as well as other carotinoids. Carotin shows the growth inducing biological action of vitamin-A. The vitamin-A reaction of butter may be traced to its carotinoid content.

Miscellaneous

CATALYTIC REDUCTION.—The catalytic reduction of carbon monoxide under normal pressure. I.—Experiments on the catalytic actions of various metals by means of the heating curve. II.—Experiments on the influence of various substances on the catalytic action of cobalt by means of the heating curve. S. Kodama. *J. Soc. Chem. Ind. Japan* (supplemental binding), January, pp. 4–5 B, 6 B (in German).

Synthesis of petroleum hydrocarbons from hydrogen and carbon monoxide at ordinary pressure. K. Kobayashi and K. Yamamoto. *J. Soc. Chem. Ind. Japan*, (supplemental binding) January, pp. 23–24 B (in English).

Studies on hydrogenation of highly unsaturated acids. II.—Course of the hydrogenation of methyl esters of highly unsaturated acids in the presence of a platinum catalyst. Y. Toyama and T. Tsuchiya. *J. Soc. Chem. Ind. Japan* (supplemental binding), January, pp. 27–28 B (in English).

CEMENT.—The mechanism of the setting and hardening of cement. T. Maeda. *Chimie et Industrie*, January, pp. 35–36 (in French).

Relation between composition and strength of cement mortar on combined hardening. III.—S. Nagai. *J. Soc. Chem. Ind. Japan* (supplemental binding), January, p. 29 B (in English).

GENERAL.—The chromites and ferrites of nickel and cobalt. S. Veil. *Comptes Rendus*, January 21, pp. 330–332 (in French).

Emulsions of fats and hydrocarbons and their industrial applications. L. Meunier. *Chimie et Industrie*, January, pp. 3–19 (in French).

PETROLEUM.—Occurrence of higher fatty acids in natural petroleum and origin of petroleum. Y. Tanaka and T. Kuwata. *J. Soc. Chem. Ind. Japan* (supplemental binding), January, pp. 3–4 B (in English).

WOOD DISTILLATION, ETC.—The formation and origin of acetic acid and other volatile organic constituents of pyroligneous liquid. C. Padovani and J. Burrai. *Chimie et Industrie*, January, pp. 20–31 (in French).

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

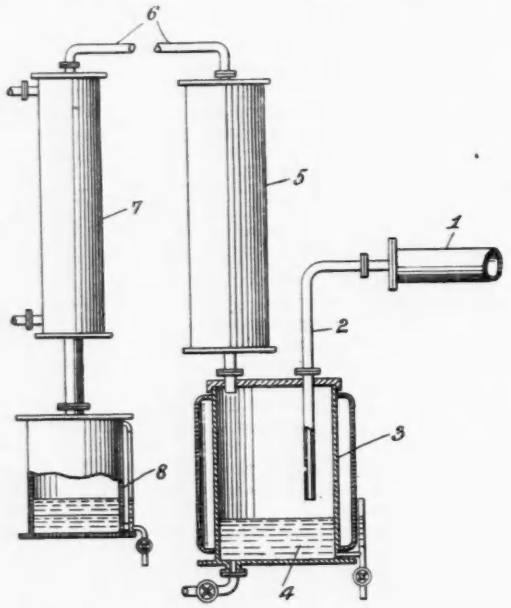
Abstracts of Complete Specifications

303,761. HYDROCARBONS OF LOW BOILING POINT FROM THOSE OF HIGH BOILING POINT, PRODUCTION OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 3, 1927, and February 25, 1928.

Tar oils, tar, mineral oils, shale oils, and products obtained by destructive hydrogenation of coal, etc., are treated with a gaseous hydrogen halide at a temperature above 100° C. without increase of pressure, in the presence of an activated metal. The metal may be aluminium, copper, lead, magnesium, iron, cobalt, or chromium, and it may be activated by treating with a solution of a salt of a metal which is less electropositive. The activation is more effective if the metal is previously treated with caustic soda or hydrochloric acid. The activated metal may be used in conjunction with anhydrous metal chlorides, particularly aluminium choride. If the hydrogen halide is passed through at a high velocity, a high yield of hydrocarbons boiling below 70° C. is obtained. The products only require washing with caustic soda solution, or steam distillation.

303,772. ALIPHATIC ANHYDRIDES, MANUFACTURE OF. British Celanese, Ltd., and H. Dreyfus, 8, Waterloo Place, London, S.W.1, and C. I. Haney, of British Celanese, Ltd., Spondon, near Derby. Application date, July 7, 1927. Addition to 256,663.

Specification No. 256,663 (see THE CHEMICAL AGE, Vol. XV, p. 278) describes the production of acetic anhydride from



303,772

acetic acid by heating, and condensing the anhydride while the water present is maintained in gaseous form. In the present invention, the fractional condensation is assisted by employing the vapour of benzene, carbon tetrachloride, petrol, etc., to carry away the water vapour. The vapours from the reaction zone 1 pass through pipe 2 into steam-jacketed vessel 3, containing some benzene 4, which is kept boiling. The gases enter at 110° C. to 140° C., and most of the anhydride condenses and mixes with the benzene, while water vapour and benzene vapour pass into the fractionating column 5, which is kept at 78° C. so that any anhydride is returned. Vapours pass through pipe 6 to condensers 7, and benzene and water are received in vessel 8 where they separate into two layers.

303,813. INTRODUCING SULPHO-CYANIDE GROUPS INTO ORGANIC COMPOUNDS, PROCESS FOR. A Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 5, 1927.

Organic compounds particularly of the aromatic series are treated with a soluble sulpho-cyanic salt and a halogen in the presence of a neutral organic medium which is a solvent for the organic compound and for the sulpho-cyanic salt. Suitable solvents are alkyl acetates, particularly methyl acetate, and lower aliphatic alcohols, particularly methyl alcohol. The solvent may be protected from the action of the reacting substances by saturating it with an alkali chloride or bromide. The starting substances may be aromatic amines having the para position to the amino group blocked. Examples are given.

303,916. MIXED FERTILISERS. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 12, 1927.

This fertiliser consists of potassium and sodium nitrates, the amount of sodium nitrate being preferably 20–50 per cent. and not more than 60 per cent. It has been found by experiment that the fertilising value of the mixture is greater than that of either sodium or potassium nitrate containing the same amount of nitrogen.

303,917. SULPHONIC ACIDS, PRODUCTION OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 12, 1927.

Unsaturated aliphatic hydrocarbons or their derivatives containing halogen or unsaturated hydro aromatic compounds can be converted into water soluble products containing sulphonic groups by treating with sulphonating agents such as sulphuric acid, sulphuric anhydride, or chloro-sulphonic acid, and an equimolecular amount of an organic acid anhydride or chloride, such as formic or acetic acid, acetic anhydride or acetyl chloride, or an equi-molecular amount of phosphoric acid or its anhydride or a chloride. The process is applicable to propylene or its higher homologues, or butadiene, or substances containing a large proportion of unsaturated aliphatic hydrocarbons such as petroleum, brown coal tar oils, or gaseous or liquid products from the cracking of petroleum or tar oils. The products have a high acid resisting power, and are used as wetting, cleaning, emulsifying or dispersing agents, or as solvents. Examples are given of the treatment of tetrahydro-benzene, and propylene.

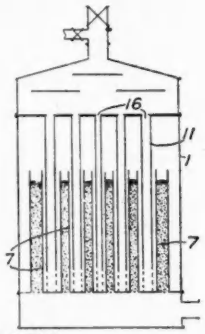
303,998. OLEFINES AND DIOLEFINES, PRODUCTION OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 14, 1927.

Olefines and diolefines are obtained from paraffins or olefines or mixtures, which initial material can also be cyclic, by vaporising them and passing at 550–750° C. over a catalyst consisting of a special form of carbon the surface of which has a high lustre. The preparation of this carbon is described in Berichte der Deutschen Chemischen Gesellschaft, Vol. 56, p. 2071, and Vol. 59, p. 2433. The carbon is preferably deposited on difficultly reducible metallic oxide and compounds such as glucinum oxide, tricalcium phosphate, aluminium or chromium oxide, active silica, natural or artificial silicates, quartz, or porcelain, or metals such as copper or chromium. The process is applicable to the treatment of cyclo-hexane, tetra-hydrobenzene, tetra-hydronaphthalene, terpenes, naphthenes, Caucasian naphtha, crude mineral oils, their conversion and cracking products, destructive hydrogenation products, brown coal tar, and low temperature carbonisation tar. Diluent gases may be present, such as nitrogen, carbon dioxide, methane and water vapour, the latter being particularly advantageous.

International Specifications not yet Accepted

301,799. CATALYTIC APPARATUS. Selden Co., McCartney Street, Pittsburg, U.S.A. (Assignees of A. O. Jaeger, 9, North Grandview Avenue, Crafton, Pa., U.S.A.) International Convention date, December 5, 1927.

A catalytic apparatus comprises a chamber 1 divided into concentric annuli by circular partitions 7. The annuli are



301,799

alternately filled with catalyst and act as heat exchangers. The gases flow downwards through annular passages 11 in the annular spaces, then upwards over the passages 11, and then downwards through the catalyst. The spaces may be of different width.

301,808. OXYETHYLAMINO-OXYBENZENE. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, December 5, 1927.

Hydroquinone is heated with 2-aminoethanol without a condensing agent to obtain 4- (β-oxyethylamino)-1- oxybenzene Examples of the process are given.

302,142–3. VULCANIZING RUBBER. Goodyear Tire and Rubber Co., 1144, East Market Street, Akron, Ohio, U.S.A. (Assignees of J. Teppema, 29, Mayfield Apartment, Twin Oaks, Ohio, U.S.A.). International Convention date, December 10, 1927.

302,142. A vulcanisation azcelerator consists of the reaction product of a 2-halogen-benzothiazole and a dithiocarbamate.

302,143. A vulcanisation accelerator consists of the reaction product of a benzoyl nitrophenyl sulphur halide, and an alkali salt of an organic sulphide.

302,144 and 302,147. PRESERVING INDIARUBBER. Goodyear Tire and Rubber Co., 1144, East Market Street, Akron, Ohio, U.S.A. (Assignees of A. M. Clifford, 649, Honodle Avenue, Akron, Ohio, U.S.A.). International Convention date, December 10, 1927.

302,144. The ageing qualities of rubber are improved by adding the reaction product of an aromatic amine and an aliphatic acid or ester. Examples are given.

302,147. The ageing qualities of rubber are improved by adding a non-accelerating substituted phenyl or aryl hydroxy compound, *e.g.*, α-chlor-β-naphthol.

302,148. FERTILIZERS. Chemieverfahren Ges., 15, Wilhelmstrasse, Bochum, Germany. International Convention date, December 10, 1927.

Crude phosphate is treated with potassium sulphate and nitric acid so as to form calcium sulphate, potassium nitrate and free phosphoric acid. The mixture is filtered and the filtrate neutralised with ammonia and evaporated.

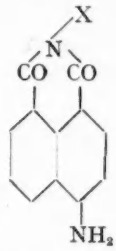
302,176. VULCANIZING RUBBER. Naugatuck Chemical Co., Elm Street, Naugatuck, Conn., U.S.A. (Assignees of S. M. Cadwell, 561, West 58th Street New York). International Convention date, November 1, 1926.

A vulcanisation accelerator consists of a hydrolysed halogen-free derivative of aldehyde-amine condensation products. The aldehyde has a number of carbon atoms in an open chain, *e.g.*, heptaldehyde.

302,171, 302,173 and 302,175. DYES AND INTERMEDIATES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, December 8 and December 10, 1927.

302,171. 1-Aminoanthraquinone-2-sulphonic acid in aqueous solution or suspension is well cooled and treated with chlorine to obtain 4-chloro-1-aminoanthraquinone-2-sulphonic acid.

302,173. A 4-amino-naphthalic acid derivative having the formula



where X represents hydrogen, alkyl, aryl, or aralkyl, is diazotised and coupled with a 2 : 3- hydroxy-naphthoic acid arylide to obtain azo dyes. The dye 4-amino-1 : 8-naphthal-methylimide→2 : 3 hydroxy-naphthoic acid-2′ : 5′-dimethoxy-1′anilide is an example.

302,175. Phosphorus pentoxide on a porous carrier is employed for ring closure of aryl-thioglycollic acids, *e.g.*, *m*-chlorphenyl-thioglycollic acid and β-naphthyl-thioglycollic acid. Hydroxy-thionaphthenes are obtained, and may be converted into vat dyestuffs.

302,178. CHROMIUM OXIDE. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, December 10, 1927.

An alkali chromate or dichromate is treated with red phosphorus in insufficient quantity to form chromium phosphates. The alkali phosphate is lixiviated out, leaving chromium oxide.

302,251. DYES. I.G. Farbenindustrie Akt.-Ges, Frankfort-on-Main, Germany. International Convention date, December 12, 1927.

A diazotised dihalogen-2-anisidine in which one halogen is in *p*-position to the methoxy group is coupled with an arylide of 2 : 3-oxynaphthoic acid to obtain azo dyes insoluble in water. These dyes are fast to steaming without addition of chromate.

302,268–9. ACETIC AND OTHER ALIPHATIC ACIDS. Holzverkohlungs-Industrie Akt.-Ges., Konstanz, Baden, Germany. International Convention date, December 13, 1927. Additions to 291,433–4 (see THE CHEMICAL AGE, Vol. XIX, p. 126).

A solution of acetic acid in water or an organic solvent is treated with sodium acetate to form an acid salt. The acid is distilled off under reduced pressure at 170–220° C.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—275,672 (J. Blumenfeld) relating to titanium compounds see Vol. XVII, p. 352 ; 279,070 (Consortium für Elektrochemische Industrie Ges.) relating to acetic anhydride, see Vol. XVII, p. 557 ; 281,611 (N. Caro and A. R. Frank) relating to cyanamides of alkaline earth metals and magnesium, see Vol. XVIII, p. 104 ; 282, 772 (M. Buchner) relating to purification of minerals containing alumina, see Vol. XVIII. p. 204 ; 287,178 (I.G. Farbenindustrie Akt.-Ges.) relating to substituted thioglycollic acids, see Vol. XVIII, p. 495 ; 290,997 (I.G. Farbenindustrie Akt.-Ges.) relating to N-oxyethyl derivatives of 4-amino-1-oxybenzene, see Vol. XIX, p. 85 ; 296,048 (Selden Co.) relating to contact sulphuric acid process, see Vol. XIX, p. 400 ; 296,071 (Selden Co.) relating to contact sulphuric acid process, see Vol. XIX, p. 400 ; 296,071 (Selden Co.) relating to catalytic oxidation of organic compounds, see Vol. XIX, p. 419 ; 297,029 (Schering Kahlbaum Akt.-Ges.) relating to substituted guanidines, see Vol. XIX, p. 497.

LATEST NOTIFICATIONS.

305,121. Production of nitrate of ammonia. Appareils et Evaporateurs Kestner. January 31, 1928.

305,197. Process of improving the resistance to corrosion of magnesium and magnesium alloys. I.G. Farbenindustrie Akt.-Ges. February 2, 1928.

305,122. Process for colouring, sizing, impregnating, or otherwise treating paper. I.G. Farbenindustrie Akt.-Ges. January 31, 1928.

305,198. Catalysts, and particularly the catalytic hydrogenation and dehydrogenation of organic compounds. Holzverkohlungs Industrie Akt.-Ges. February 2, 1928.

305,209. Packing for Röntgen photographic materials. I.G. Farbenindustrie Akt.-Ges. February 3, 1928.
305,096. Process for the preparation of cellulose acetate. Ruth-Aldo Co., Inc. January 30, 1928.
305,136. Process for manufacturing a vat dyestuff. Bensa, F. January 31, 1928.
305,211. Production of shaped articles from urea or its derivatives, solid polymerized aldehydes, and fillers. Bakelite Ges. February 3, 1928.
305,218. Manufacture of anti-rust paints. I.G. Farbenindustrie Akt.-Ges. February 2, 1928.
305,140. Process for the manufacture of aryl-carboxy-amido-ortho-thioglycollic acids. I.G. Farbenindustrie Akt.-Ges. January 31, 1928.
305,143. Manufacture of silver halide emulsions. I.G. Farbenindustrie Akt.-Ges. January 31, 1928.
305,223. Devices for the distillation and complete recovery of alcohol produced in baking ovens. Navrotzky, N. de. February 2, 1928.
305,174. Process for the manufacture of monoazo dyestuffs. I.G. Farbenindustrie Akt.-Ges. February 1, 1928.
305,472. Production of stabilised hydrogen peroxide solutions containing alkali. Naamlooze Vennootschap Electrochemische Industrie. February 4, 1928.
305,230. Dyeing of piece goods and yarns with vat dyestuffs. I.G. Farbenindustrie Akt.-Ges. February 2, 1928.
305,237. Processes for producing rapidly-hardening odourless phenolaldehyde resins and mixtures of these with fillers. Bakelite Ges. February 3, 1928.
305,476. Process for producing colour resists under aniline black by means of ice colours. I.G. Farbenindustrie Akt.-Ges. February 2, 1928.
305,487. Process for the manufacture of azo dyestuffs. I.G. Farbenindustrie Akt.-Ges. February 3, 1928.
305,488. Manufacture of vat dyestuffs and intermediates of the anthraquinone series. I.G. Farbenindustrie Akt.-Ges. February 3, 1928.
305,489. Manufacture of vat dyestuffs and intermediates of the anthraquinone series. I.G. Farbenindustrie Akt.-Ges. February 3, 1928.
305,490. Process for the manufacture of rubber pastes. I.G. Farbenindustrie Akt.-Ges. February 3, 1928.

Specifications Accepted with Date of Application

279,856. Condensation products from crude cresol and aliphatic ketones, Manufacture of. Schering Kahlbaum Akt.-Ges. October 26, 1926. Addition to 273,684.
281,662. Ethyl alcohol gels, Manufacture of. H. Ohle and J. Othmar-Neuscheller. November 30, 1926.
283,482. Azo dyestuffs, Manufacture of. Durand and Huguenin Akt.-Ges. January 10, 1927.
292,991. Potassium manganate, Manufacture of. Soc. Chimique des Usines du Rhône. June 29, 1927.
304,623. Liquid or solid products-, Manufacture of—by gaseous reaction under the influence of silent electrical discharge. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). October 20, 1927.
304,809. Green hydrated chromium oxide, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). October 24, 1927.
304,829. Purifying tin ores and other stanniferous materials W. Witter, M. Lissauer, H. Lissauer, and B. Griesmann (trading as M. Lissauer et Cie.). October 27, 1927.
304,855. Acetaldehyde and acetic acid, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). November 2, 1927.
304,872. Crystals of uniform coarse grain, especially of fertiliser salts, Means for obtaining. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). November 24, 1927.
304,893. Alloys. T. D. Kelly. December 23, 1927.
304,914. Gaseous hydrocarbons, Transformation of. P. H. Hull, and Imperial Chemical Industries, Ltd. January 21, 1928.
304,926. Oils and naphthenic acids from still residues obtained in the purification of mineral oils. C. Arnold. (*Humble Oil and Refining Co.*). February 6, 1928.
294,263. Thio semicarbazones of arseno-phenol-aldehydes or arsenophenol-ketones, Manufacture of. I.G. Farbenindustrie Akt.-Ges. July 21, 1927.
294,654. Fertilizers, Manufacture of. I.G. Farbenindustrie Akt.-Ges. July 29, 1927.

Applications for Patents

Brightman, R. and Imperial Chemical Industries, Ltd. Manufacture of azo dyes. 4,164, 4,165. February 7.
Brightman, R., and Imperial Chemical Industries, Ltd. Dyeing regenerated cellulose materials. 4,337, 4,338. February 8.
British Cyanides Co., Ltd. Manufacture of moulded articles. 4,450. February 9.
Carpmael, A. and I.G. Farbenindustrie Akt.-Ges. Manufacture of orthoaminoaryl, etc. compounds. 3,768. February 4. (November 18, 1928.)
Carpmael, A. and I.G. Farbenindustrie Akt.-Ges. Manufacture of aluminium fluoride. 3,901. February 5.
Chemische Fabrik Grünau, Landshoff and Meyer, Akt.-Ges. Manufacture of N-methyl-amino-phenols. 3,966. February 6. (Germany, February 29, 1928.)
Coley, H. E. Manufacture of zinc. 3,681. February 4.
Deutsche Gold- und Silber Scheideanstalt vorm. Roessler. Process for preparing N-substituted cyano-formaryhides. 3,897. February 5. (Germany, February 20, 1928.)
Fairweather, D. A. W., Scottish Dyes, Ltd., and Thomas, J. Dyeing, etc. 4,328. February 8.
Fairweather, D. A. W., Scottish Dyes, Ltd., and Thomas, J. Production of dyestuffs, etc. 4,329. February 8.
Federal Phosphorus Co. Manufacture of diphenyl. 4,304. February 8. (United States, June 2, 1928.)
Hercules Powder Co. Denitrating acid mixtures, etc. 3,905. February 5. (United States, October 26, 1928.)
Holt, F., Imperial Chemical Industries, Ltd., and Thomas, R. Treatment of halogenated naphthalenes. 4,322. February 8.
I.G. Farbenindustrie Akt.-Ges and Johnson, J. Y. Manufacture of valuable organic compounds. 3,670. February 4.
I.G. Farbenindustrie Akt.-Ges and Johnson, J. Y. Apparatus for clarification of liquids, etc. 4,132. February 7.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Apparatus for dehydration of peat. 4,256. February 8.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Apparatus for heating liquids capable of being decomposed. 4,257. February 8.
I G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of organic acids. 4,258. February 8.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of agents having saponaceous properties. 4,408. February 9.
I G. Farbenindustrie Akt.-Ges. Production of anhydrous aluminium chloride. 3,684. February 4. (Germany, February 7, 1928.)
I.G. Farbenindustrie Akt.-Ges. Preparing active substances from hypophysis glands. 3,697. February 4. (Germany, February 4, 1928.)
I.G. Farbenindustrie Akt.-Ges. Producing colour resists under aniline black. 3,698. February 4. (Germany, February 2, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of azo dyestuffs. 3,762. February 4. (Germany, February 3, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of vat dyestuffs, etc. 3,763, 3,764. February 4. (Germany, February 3, 1928.)
I.G. Farbenindustrie Akt.-Ges Manufacture of rubber pastes. 3,765. February 4. (Germany, February 3, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of active substances from hypophysis glands. 3,860. February 5.
I.G. Farbenindustrie Akt.-Ges. Manufacture of alkaline earth, etc. 4,051. February 6. (Germany, February 7, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of phenoxy quinoline carboxylic acids, etc. 4,052. (Germany, February 7, 1928.)
I F. Farbenindustrie Akt.-Ges. Manufacture of vat dyestuffs. 4,143. February 7. (Germany, February 7, 1928.)
I G Farbenindustrie Akt.-Ges. Manufacture of ortho-(amino-aroyl)- benzoic acids, etc. 4,144. February 7. (Germany, February 7, 1928.)
I.G. Farbenindustrie Akt.-Ges. Process of separating formic acid from acetic acid. 4,145. February 7. (Germany, February 7, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of organic acid esters of cellulose. 4,146. February 7. (Germany, February 17, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of water-soluble products from fatty acids. 4,183. February 7. (Germany, February 7, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of hormones. 4,344. February 8. (October 17, 1927.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of soluble acyl celluloses. 4,349. February 8. (Germany, February 9, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of dyestuffs. 4,451. February 9. (Germany, February 10, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of products from waste liquors. 4,452. (Germany, February 11, 1928.)
Imperial Chemical Industries, Ltd., Lodge, F. and Tatum, W. W. Preparation of dyestuffs. 4,339. February 8.
Milnesia International, Inc. Process of preparing, etc., magnesium hydrate. 3,885. February 5. (United States, May 3, 1928.)
Morgan, G. T., Pratt, D. D. and Sinnatt, F. S. Treating tars. 3,676. February 4.
Morgan, G. T., Pratt, D. D. and Sinnatt, F. S. Obtaining products from tars etc. 3,677. February 4.
Morgan, G. T. High pressure gas etc. vessels. 3,992. February 6.
Selden Co. Catalytic ammonia synthesis. 4,245. February 8. (United States, March 8, 1928.)
Selden Co. Catalytic apparatus. 4,247. February 8. (United States, October 27, 1926.)

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £30 per ton; powder, £32 per ton; extra fine powder, £34 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° TW.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder. £21 per ton. (Packed in 2 cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3⅞d. per lb., ex-wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6½d. to 6¾d. per lb. Crude 60's, Feb./Mar., 1s. 10½d. per gall.

ACID CRESYLIC 99/100.—2s. 5d. to 2s. 10d. per gall. 97/99.—2s. 2d. to 2s. 3d. per gall. Pale, 95%, 1s. 11d. to 2s. per gall. Dark, 1s. 9d. to 1s. 10d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £5 per ton.

ANTHRACENE OIL, STRAINED.—7¾d. to 8d. per gall. Unstrained, 7¼d. to 7½d. per gall.

BENZOLE.—Prices at works: Crude, 10d. to 10½d. per gall.; Standard Motor, 1s. 4d. to 1s. 4½d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 5d. to 1s. 9d. per gall. Firm. Pure, 1s. 10d. to 2s. 2d. per gall.

XYLOL.—1s. 3d. to 1s. 11d. per gall. Pure, 1s. 6d. to 1s. 7d. per gall.

CREOSOTE.—Cresylic, 20/24%, 8¾d. per gall.; Heavy, 7d. to 7½d. per gall. Middle oil, 5¾d. to 6¼d. per gall. Standard specification, 5¼d. to 5½d. per gall. ex works. Salty, 7¼d. per gall.

NAPHTHA.—Crude, 8½d. to 9d. per gall. Solvent, 90/160, 1s. 1½d. to 1s. 2½d. per gall. Solvent, 95/160, 1s. 2d. to 1s. 6d. per gall. Solvent 90/190, 11d. to 1s. 3d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £12 5s. to £14 10s. per ton. Quiet Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 35s. to 36s. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 4s. 3d. to 6s. 6d. per gall. 90/180, 2s. 3d. to 3s. per gal. Heavy, 1s. 9d. to 2s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8½d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—5½d. per lb.

m-CRESOL 98/100%.—2s. 3d. to 2s. 6d. per lb.

p-CRESOL 32/34° C.—2s. 3d. to 2s. 6d. per lb.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITHROBENZENE.—8d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 7½d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—10d. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb.

B-NAPHTHYLAMINE.—3s. per lb.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—8d. per lb.

p-TOLUIDINE.—1s. 9d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10½d. per gall. 16° Tw.

WOOD CRESOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d. per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton.

BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 9d. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £54 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—4⅝d. to 5⅞d. per lb.

LAMP BLACK.—£32 10s. per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPHONE, 30%.—£23 per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£10 to £12 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.

SULPHUR PRECIP. B. P.—£55 to £60 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. 10d. to 7s. per lb.

ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 4½d. to 2s. 5d. per lb.

ACID, BENZOIC, B.P.2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz., according to quantity.

ACID, BORIC B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carraige paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—2s. 1d. to 2s. 2d. per lb., less 5%.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 6d. to 1s. 7d. per lb. Technical.—10½d. to 11½d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 4½d. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—7s. 9d. to 8s. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
ATROPHINE SULPHATE.—9s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.
BISMUTH CARBONATE.—9s. 9d. per lb.
BISMUTH CITRATE.—9s. 3d. per lb.
BISMUTH SALICYLATE.—8s. 9d. per lb.
BISMUTH SUBNITRATE.—8s. 3d. per lb.
BISMUTH NITRATE.—Cryst. 5s. 9d. per lb.
BISMUTH OXIDE.—12s. 3d. per lb.
BISMUTH SUBCHLORIDE.—10s. 9d. per lb.
BISMUTH SUBGALLATE.—7s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W Qts. 11d. per lb.
BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Ammonium, 2s. to 2s. 3d. per lb.; potassium, 1s. 8½d. to 1s. 11½d. per lb.; sodium, 1s. 11d. to 2s. 2d. per lb.; granulated, ½d. per lb. less; all spot. Large quantities at lower rates.
CALCIUM LACTATE.—B.P., 1s. 3d. to 1s. 4d. per lb.
CAMPHOR.—Refined flowers, 2s. 11d. to 3s. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 2d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.
HEXAMINE.—1s. 11d. to 2s. 2d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 9d. per lb.; potassium, 3s. per lb.; sodium, 2s. 11d. per lb., in 1 cwt. lots, assorted.
IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 11d. per lb. Green, 3s. 1d. to 3s. 4d. per lb.; U.S.P., 2s. 9d. to 3s. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8¾d. to 9¼d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 23s. per lb. net; Synthetic, 11s. to 12s. 6d. per lb.; Synthetic detached crystals, 11s. to 16s. per lb., according to quantity; Liquid (95%), 9s. 6d. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 6d. per lb.
METHYL SULPHONAL.—8s. 9d. to 9s. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—2s. 5d. to 2s. 8d. per lb.
PHENAZONE.—3s. 9d. to 4s. per lb.
PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—96s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 6d. to 2s. 9d. per lb.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—47s. per lb.; in quantity lower.
SALOL.—2s. 3d. to 2s. 6d. per lb.
SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.
SODIUM CITRATE, B.P.C., 1911.—2s. 3d. to 2s. 6d. per lb., B.P.C. 1923—2s. 8d. to 2s. 9d. per lb. U.S.P., 2s. 6d. to 2s. 9d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—95s. to 100s. per cwt. Crystals, 5s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 5½d. to 1s. 7d. per lb. Crystal, 1s. 6½d. to 1s. 8d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10s. to 1s. 1d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £28 10s. per ton, according to quantity., Delivered U.K.
SULPHONAL.—6s. 6d. to 6s. 9d. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.
THYMOL.—Puriss., 9s. 6d. to 9s. 9d. per lb., according to quantity. Firmer. Natural, 12s. 6d. per lb.

Perfumery Chemicals

ACETOPHENONE.—6s. 6d. per lb.
AUBEPINE (EX ANETHOL).—11s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—4s. 6d. per lb.
AMYL SALICYLATE.—2s. 9d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 3d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL BENZOATE.—2s. 3d. per lb.
CINNAMIC ALDEHYDE NATURAL.—15s. 6d. per lb.
COUMARIN.—8s. 6d. per lb.
CITRONELLOL.—10s. per lb.
CITRAL.—8s. 3d. per lb.
ETHYL CINNAMATE.—6s. per lb.
ETHYL PHTHALATE.—2s. 9d. per lb.
EUGENOL.—14s. per lb.
GERANIOL (PALMAROSA).—22s. per lb.
GERANIOL.—6s. 6d. to 10s. per lb.
HELIOTROPINE.—4s. 9d. per lb.
ISO EUGENOL.—16s. per lb.
LINALOL.—Ex Bois de Rose, 13s. per lb. Ex Shui Oil, 9s. 3d. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 17s. 6d. per lb. Ex Shui Oil Linalol. 10s. 6d. per lb.
METHYL ANTHRANILATE.—8s. per lb.
METHYL BENZOATE.—4s. per lb.
MUSK KETONE.—34s. per lb.
MUSK XYLOL.—7s. per lb.
NEROLIN.—3s. 9d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—10s. per lb.
RHODINOL.—48s. per lb.
SAFROL.—1s. 8d. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN.—18s. 6d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 9s. 6d. per lb.
ANISE OIL.—2s. 9d. per lb.
BERGAMOT OIL.—23s. per lb.
BOURBON GERANIUM OIL.—21s. per lb.
CAMPHOR OIL.—10d. per lb.
CANANGA OIL, JAVA.—12s. per lb.
CINNAMON OIL LEAF.—7s. 9d. per oz.
CASSIA OIL, 80/85%.—6s. per lb.
CITRONELLA OIL.—Java, 2s. 2d. per lb., c.i.f. U.K. port. Ceylon, pure, 1s. 10½d. per lb.
CLOVE OIL (90/92%).—11s. 6d. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—2s. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 17s. 6d. per lb.
LEMON OIL.—14s. 9d. per lb.
LEMONGRASS OIL.—4s. per lb.
ORANGE OIL, SWEET.—21s. per lb.
OTTO OF ROSE OIL.—Anatolian, 35s. per oz. Bulgarian, 75s. per oz.
PALMA ROSA OIL.—13s. per lb.
PEPPERMINT OIL.—English, 87s. 6d. per lb.; Wayne County, 15s. 6d. per lb.; Japanese, 8s. per lb.
PETITGRAIN.—9s. 3d. per lb.
SANDALWOOD.—Mysore, 28s. per lb.; 90/95%, 18s. 9d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, February 14, 1929.

THERE is little alteration to report in the market, inquiry for the majority of industrial chemicals being of moderate volume, and prices continue firm. Export trade has been fairly satisfactory.

General Chemicals

ACETONE.—There has been a fair amount of inquiry on the market, and the position of supplies is still rather acute. Price continues firm at £77 to £85 per ton according to quantity.

ACID ACETIC.—Business continues fair at £36 10s. to £37 10s. per ton for 80%.

ACID CITRIC.—There is not much movement in this product, although price is now steady at about 2s. 1d. to 2s. 3d. per lb., less 5%.

ACID FORMIC.—Little alteration is shown with a small inquiry at about £42 10s. for 85%.

ACID LACTIC.—There is a small trade passing at £43 per ton for 50% weight.

ACID OXALIC.—Demand has been a little better and price is firm at £30 10s. to £32 10s. per ton.

ACID TARTARIC.—There is only a small trade, and price is unchanged at 1s. 4½d., less 5%.

ALUMINA SULPHATE.—Inquiry is active, with price inclined to be firmer at £7 5s. to £8 per ton, with early delivery difficult.

AMMONIUM CHLORIDE.—The market is unchanged.

ARSENIC.—A little more business has been concluded, and inquiry for export is also a little better. Prices are unchanged at about £16 5s., f.o.r. mines.

BARIUM CHLORIDE.—Early delivery is still difficult, and small supplies available at £11 10s. to £12 per ton. The forward position continues firm.

CREAM OF TARTAR.—There is no change in the market, the demand being rather slow at £95 to £97 per ton for 99/100% B.P. quality.

COPPER SULPHATE.—Substantial business has been done and price continues firm.

FORMALDEHYDE.—Demand has been better and the market continues steady at about £39 per ton.

LEAD ACETATE.—A satisfactory trade is passing at £42 10s. per ton for white, and £41 10s. per ton for brown, with the market firm at these rates.

LEAD NITRATE.—Steady at £36 per ton, carriage paid.

LIME ACETATE.—Market continues short of supplies, and the grey quality is quoted at £18 per ton.

LITHOPONE.—Unchanged at £19 15s.–£21 per ton.

METHYL ACETONE.—In good request at £58–£60 per ton.

POTASSIUM CARBONATE AND CAUSTIC.—Unchanged and in fair demand.

POTASSIUM CHLORATE.— Rather slow at £28–£30 per ton.

POTASSIUM PERMANGANATE.—More activity is shown, and price holds firm at 5½d. lb.

POTASH PRUSSIATE.—More business is passing, and the market continues firm at £63 10s.–£65 10s. per ton according to quantity.

SODA ACETATE.—Steady at £21 5s.–£22 5s.

SODIUM BICHROMATE.—Firm at 3½d. lb., with rebates for contracts, and there is little outside material available.

SODIUM CHLORATE.—Steady at about £25 per ton.

SODIUM HYPOSULPHITE.—Commercial quality in fair demand at British makers' prices, which are unchanged.

SODIUM NITRITE.—Steady demand at £20 per ton.

SODIUM PHOSPHATE.—Market unchanged at £12 per ton for dibasic and about £17 10s. per ton for tribasic. Enquiry fair.

SODIUM PRUSSIATE.—Firm and in satisfactory demand at 4½d.–5½d. lb.

SODIUM SULPHIDE.—Unchanged at British makers' prices.

TARTAR EMETIC.—Enquiry is better with the market steady at 10½d.–11d. lb.

ZINC SULPHATE.—In fair demand at £12 per ton.

Coal Tar Products

Whilst there is little change in the prices of coal tar products to report from last week, there seems to be a better tone in the market, and more business is moving.

MOTOR BENZOL remains scarce, the price being about 1s. 7½d. to 1s. 8d. per gallon f.o.r. makers' works.

SOLVENT NAPHTHA is unchanged at 1s. 1½d. per gallon f.o.r. and only small quantities obtainable.

HEAVY NAPHTHA is quoted at 1s. 1d. to 1s. 1½d. per gallon on rails but not large demand.

CREOSOTE OIL.—Market price remains at about 5½d. per gallon on rails in the North, although spot parcels can be had slightly below this figure. The price in London still stands at about 6d. per gallon.

CRESYLIC ACID is still weak, the 98/100% quality is quoted at 1s. 10d. per gallon, but is moving more freely. Dark quality 95/97% at 1s. 8d. per gallon f.o.b.

NAPHTHALENE.—The firelighter quality is quoted at about £4 10s. per ton, the 74/76 quality at £5 per ton, and the 76/78 quality at £6 to £6 5s. per ton.

PITCH is weaker, at 32s. 6d. to 35s. per ton, f.o.b.

Nitrogen Products

Sulphate of Ammonia.—The demand for sulphate continues steady and the price remains firm at £10 2s. per ton, f.o.b. U.K. port in single bags. It is reported from the Continent that the sales are on a much higher scale than last year.

Home.—On account of the very cold weather the demand is rather sluggish. A brisk demand is anticipated, especially from the south of England, immediately the weather improves.

Nitrate of Soda.—It is reported that good sales continue to be made at scale prices.

Latest Oil Prices

LONDON, February 13.—LINSEED OIL was firm and in improved request at 5s. per ton advance. Spot, ex mill, £31; February, £29 7s. 6d.; March–April, £29 5s.; May–August, £29 15s.; and September–December, £30, naked. RAPE OIL was steady. Crude extracted, £43; technical refined, £45, naked, ex wharf. COTTON OIL was steady. Egyptian crude, £29 10s.; refined common edible, £35; and deodorised, £37, naked, ex mill. TURPENTINE was steadier and 6d. per cwt. higher. American spot, 45s. 9d., and March–April, 46s. 3d.

HULL, February 13.—LINSEED OIL.—Spot and February, £29 2s. 6d.; March–April, £29 5s.; May–August, £29 10s.; September–December, £29 17s. 6d. per ton, naked. COTTON OIL.—Bombay crude, £27 5s.; Egyptian crude, spot (new) and February–April, £28; edible refined, £31 10s.; technical, £31 5s.; deodorised, £33 10s. per ton, naked. PALM KERNEL OIL.—Crushed, 5½ per cent., £36 10s. per ton, naked. GROUNDNUT OIL.—Crushed-extracted, £36 10s.; deodorised, £40 10s. per ton. SOYA OIL.—Extracted and crushed, £31; deodorised, £34 10s. per ton. RAPE OIL.—Crushed-extracted, £42; refined, £44 per ton. CASTOR OIL.—Pharmaceutical, 52s.; firsts, 47s.; seconds, 44s. 6d., barrels, per cwt. COD OIL.—32s. barrels, per cwt., net cash terms, ex mill. TURPENTINE unchanged.

South Wales By-Products

Quiet conditions continue to prevail in South Wales by-products. Business is quiet all round and quite featureless. Pitch is depressed and has very little call with values nominal round the 35s. to 37s. per ton mark. Crude tar has fallen back slightly to from 30s. to 32s. per ton producer's works and has very little demand. Road tar is unchanged from 12s. to 15s. per 40 gallons barrel. Solvent naphtha is stronger and increased demand has seen values strengthen to 1s. 2d. to 1s. 4d. per gallon. Crude naphthalene is quiet round the 80s. per ton mark, while there is very little call for whizzed at 100s. per ton. Refined tars have a steady, if moderate, demand and values are unchanged. Coke oven tar is quoted at from 7d. to 7¾d. per gallon delivered, and gasworks tar at from 6½d. to 7d. per gallon, delivered. Patent fuel and coke exports are holding well and values are unchanged. Patent fuel exports over the last four ascertainable weeks totalled 79,500 tons—an increase of 9,625 tons on the last period. Prices are unchanged, patent fuel, ex ship Cardiff, being 20s. to 21s. per ton; ex ship Swansea, 19s. to 19s. 3d. per ton. Coke, best foundry, 32s. 6d. to 36s. 6d. per ton; furnace, 19s. to 21s.; and good foundry from 25s. to 32s. 6d. per ton.

Employers Reject Melchett-Turner Report

BOTH the National Confederation of Employers' Organisations and the Federation of British Industries have rejected the Melchett-Turner Report on industrial relations. The decision was reached at meetings which the councils of each of these separate organisations held on Wednesday and was conveyed in a joint letter to the general secretary of the Trades Union Congress. At the same time the employers' organisations issue an invitation to the General Council of the Congress to a conference to examine the question of "usefully consulting together upon matters of common interest to British industry."

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, February 13, 1929.

DURING the past week the heavy chemical market has been if anything more lively than for some little time, export inquiry remaining particularly good.

Industrial Chemicals

ACETONE.—B.G.S., £77 10s. to £85 per ton, ex wharf, according to quantity. There is still a little available for immediate delivery.

ACID ACETIC, 98/100%.—Glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports. 80% pure, £37 10s. per ton, ex wharf. 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £38 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Quoted 6¾d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Quoted 2¾d. per lb., less 5%, ex wharf.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC, 80°.—Quality, £24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Quoted 3½d. per lb. Spot delivery offered to come forward at 3¼d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton, ex works, for 144° quality; £5 15s. per ton for 168° quality. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC., B.P. CRYSTALS.—Quoted 1s. 4½d. per lb., less 5% ex wharf. Offered for prompt shipment at 1s. 4d. per lb., less 5% per cent. ex wharf.

ALUMINA SULPHATE.—On offer at £5 10s. per ton, c.i.f. U.K. ports. Spot material quoted £5 15s. per ton, ex store.

ALUM, LUMP POTASH.—Rather dearer and now quoted £8 12s. 6d. per ton, c.i.f. U.K. ports. Crystal meal on offer at £9 per ton, ex store.

AMMONIA ANHYDROUS.—Quoted 9½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Rather easier and now quoted at £35 15s. per ton, c.i.f. U.K. ports. Offered for prompt delivery at £39 per ton ex store.

ARSENIC, WHITE POWDERED.—Quoted £18 10s. per ton, ex wharf, prompt despatch from mines. Spot material on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—On offer from the Continent at £10 5s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price £4 5s. to £4 15s., per ton, according to quality and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works, or £4 12s. 6d. per ton, f.o.b. U.K. ports.

COPPER SULPHATE.—Steady and price about £25 15s. per ton, ex wharf.

FORMALDEHYDE, 40%.—Good enquiry and price unchanged at about £37 10s. per ton, ex store.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—On offer at £29 10s. per ton, ex store.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD, ACETATE.—White Crystals quoted £41 10s. per ton. Brown on offer about £39 10s. per ton, ex store.

MAGNESITE. GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRITS.—Industrial quality, 64 O.P., quoted 1s. 4d. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance of 2½% for minimum 2½ tons to be taken during six months.

POTASSIUM CARBONATE. 96/98%.—Offered from the Continent £25 10s. per ton, c.i.f. U.K. Spot material quoted £36 10s. per ton, ex store.

POTASSIUM CHLORATE, 99¾/100% POWDER.—Quoted £22 15s. per ton, c.i.f. U.K. ports.

POTASSIUM NITRATE.—Refined Granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 5¼d. per lb, ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Offered for prompt shipment from the Continent at 6¾d. per lb., ex wharf. Spot material quoted 7d. per lb., ex store.

SODA CAUSTIC.—Powdered 98/99% now £17 10s. per ton in drums, £18 15s. per ton in casks. Solid 76/77%, £14 10s. per ton in drums, 70/72% £14 2s. 6d. per ton in drums, all carriage paid buyers' station, minimum 4-ton lots, for contracts 10s. per ton less.

SODIUM ACETATE.—On offer for prompt delivery at about £21 5s. ton, ex store.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Price during first six months of this year, 3½d. per lb., delivered U.K. or c.i.f. Irish ports, less 2½% for contract of minimum 2½ tons.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, 27s. 6d. per ton. Extra light soda ash, £7 13s. per ton, ex quay, minimum 4-ton lots, with various reductions for contracts.

SODA HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton ex station, minimum 4-ton lots. Prices for this year unchanged.

SODA NITRATE.—Price now £10 10s. per ton carriage paid, buyers' sidings, minimum 6-ton lots, usual extras for small quantities and refined qualities.

SODA SULPHATE (SALTCAKE).—Prices 50s. per ton ex works, 52s. 6d. per ton delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODA SULPHIDE.—Prices for home consumption. Solid 60/62% £9 per ton. Broken, 60/62%, £10 per ton. Crystals, 30/32% £7 2s. 6d. per ton delivered buyer's works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material 5s. per ton extra. Prices for this year unchanged.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £10 7s. 6d. per ton; Ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now quoted £22 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Offered from the Continent at about £10 5s. per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Lautaro Nitrate Co. Meeting

THE general meeting of the Lautaro Nitrate Co., Ltd., was held at Valparaiso, Chile, on Friday, December 21, 1928, Mr. Antonio Antoncich (vice-president of the local Chilean board) presiding. Mr. Antoncich said that the new system of organised distribution of nitrate was giving good results in Europe and Egypt. He then discussed the purchase by the company from Baburizza, Lukinovic and Co. of an area of 102 estacas of nitrate grounds, as already reported. The board of the Lautaro company proposed to build two nitrate plants on the new grounds, and to start at once the construction of the first one in view of the arrangements made with the Government. The proposed oficinas would be plants of a large productive capacity, equipped with all the improvements, technical and otherwise, which experience might call for. They were studying, both there and in London, a complete plan for the purpose of financing the programme. Although the stock of nitrate available for sale, if liquidated at market prices, would represent a value sufficient to pay off all the outstanding commitments, leaving an ample margin for payment of a future dividend and to meet the later requirements of the company, nevertheless, the board had thought it advisable not to declare as yet the dividend that they intended to distribute, as the cash situation did not for the moment permit the distribution.

The directors' report, the balance sheet, and the profit and loss account as at June 30, 1928, were adopted.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, February 14, 1929.

There has been no apparent expansion in the demand for chemical products on this market during the past week, although, generally speaking, business in most lines has been about maintained at the level of the last month or so. So far as the home trade is concerned, specifications for deliveries against contract commitments are reported to be coming along on a fairly satisfactory scale, with prompt market transactions for the most part still relating to relatively small lots.

Heavy Chemicals

Hyposulphite of soda meets with a quiet demand, but values in this section are fairly steady at £15 10s. per ton for the photographic material and from £9 to £9 5s. for the commercial. A steady business is passing in the case of caustic soda at firm prices, these still ranging from £12 15s. to £14 per ton, according to quality. There is a small enquiry about for sulphide of sodium, with offers of the 60–65 per cent. concentrated quality at £9 10s. per ton and the commercial at about £8. Bleaching powder is in moderate request at the moment, with quotations on the easy side at from £7 to £7 5s. per ton. There is no special feature about the demand for chlorate of soda, offers of which also have a slightly easy tendency at up to 2¾d. per lb. With regard to phosphate of soda, a quiet trade is being done in this material at round £12 5s. per ton. Saltcake is attracting only a moderate amount of interest from buyers but values in this section show little change on the week at £2 12s. 6d. per ton. Prussiate of soda is firm and continues to attract a fair amount of attention at from 4½d. to 5¼d. per lb., according to quantity. Bicarbonate of soda is well held at about £10 10s. per ton and a quietly steady business is being put through. Bichromate of soda meets with a moderate volume of enquiry and values are maintained on the basis of 3½d. per lb. There has been no change in the position of alkali; quotations are firm at round £6 per ton and a fair trade is passing.

Only a quiet business has been reported this week in the case of permanganate of potash, and the price position is somewhat easier at round 5d. per lb. for the commercial and 5¼d. to 5⅜d. per lb. for the B.P. Yellow prussiate of potash is in quietly steady request and values are firm at from 6¾d. to 7¼d. per lb., according to quantity. Round £26 per ton, ex store, is being quoted here for carbonate of potash, the demand for which this week has been about maintained at its recent level. Caustic potash is moving in fair quantities and prices are firm at from £33 5s. per ton for prompt delivery of one to five-ton lots. The movement of chlorate of potash is rather slow but at round 3d. per lb. there is little change in the price position to report. A quietly steady business is going through in bichromate of potash and quotations are steady on the basis of 4½d. per lb.

The market for sulphate of copper continues fairly active and values are exceedingly firm, offers current during the past week being at round £28 5s. per ton, f.o.b. There has been no improvement in the demand for arsenic but quotations for this material are fairly steady at £16 5s. to £16 10s. per ton, at the mines, for white powdered Cornish makes. Brown acetate of lime shows little change on the week at £9 per ton, but offers of grey have been somewhat easier at about £17 5s. The demand for lead acetate is on a quiet scale, with brown at about £39 and white at £40 per ton. Nitrate of lead is quiet but steady at from £34 to £35 per ton.

Acids and Tar Products

Tartaric acid is steady at 1s. 4d. to 1s. 4¼d. per lb., and there is a moderate enquiry about. At 2s. 2d. to 2s. 3d. per lb. citric acid appears to be fairly steady at the level of the last week or two, though buying is on the quiet side. There is some enquiry about for oxalic acid, offers of which are at up to £1 12s. per cwt. Acetic acid keeps steady and meets with a fair demand at £36 per ton for the 80 per cent. commercial and £66 for the glacial.

Pitch is quiet and easy at about £1 14s. per ton, f.o.b., and the same may be said of creosote oil, quotations for which here during the week have been in the neighbourhood of 4d. per gallon. Carbolic acid crystals are steady and fairly active at 6¼d. per lb., f.o.b., with 60's crude material quoted at about 1s. 10d. per gallon. Solvent naphtha is in moderate request at 1s. 1½d. per gallon.

Company News

Waste Food Products.—The directors propose to increase the capital of the company to £400,000 by the creation of 250,000 ordinary shares of £1 each.

Broken Hill South.—The estimated surplus for the half-year ended December 31 was £140,000, after allowances for taxation, depreciation of plant and redemption of debentures.

Niger Company.—The year to June 30, 1928, shows a trading profit of £601,572 as compared with £642,075 for the previous year. The directors allocate the larger sum of £125,000 to depreciation this year and carry forward £228,129, after paying the 8% dividend on the cumulative and non-cumulative preference shares.

Horace Cory and Co.—The report for the year ended December 31 last states that the net profits were £3,934, to which is added £1,134, brought forward, and £5,000 has been transferred from the general reserve account, making, together, £10,069. The directors recommend a final dividend of 3%, making 7% for the year, leaving £319 to be carried forward.

South Staffordshire Mond Gas Co.—The report for the year ended December 31, 1928, states that the gross profit is £22,308, and after deducting prior lien and debenture stock interest, £12,916, there is a net profit of £9,392. Adding £14,023 brought forward, there is £23,415. The directors recommend a dividend of 1 per cent. (less tax) be paid on February 28, 1929, to all ordinary shareholders on register at February 26, 1929.

Borax Consolidated, Ltd.—The profits for the twelve months ended September 30, 1928, after providing for all management and administration expenses, are £307,187 15s. 7d. The requirements for the debenture interest for the year, the interim dividends on the preference shares and on the preferred ordinary shares paid May 1, 1928, amounted to £139,640 10s. 6d., leaving, with the amount brought forward, a sum to be dealt with of £400,592. To buildings, plant, etc., depreciation reserve account, there has been placed the sum of £30,000; to the credit of the debenture stock redemption sinking fund, the annual premium of £5,825. There remains to the credit of profit and loss account, after providing for these the sum of £364,767, out of which final dividends were paid on November 1 last on the preference shares, £22,000, and on the preferred ordinary shares £18,000, and the interim dividend on the deferred ordinary shares paid on November 26 last amounted to £28,750, leaving a balance of £296,017. From this balance the directors propose to pay a final dividend of 1s. per share on the deferred ordinary shares, making 7½ per cent. for the year, to place to income tax reserve accrued to September 30, 1928, £5,000, and to carry forward to the next account £233,517. The annual meeting will be held at the Terminus Hotel, Cannon Street, London, on February 20, at 12 noon.

Derating and China Clay

An M.P.'s Views

Mr. G. Pilcher, M.P. for the Penryn-Falmouth Division, in a recent speech on the Derating Bill, claimed that the Bill was an endeavour to relieve industries like China Clay, agriculture, coal and iron and steel of the tremendous burden of rates which was often crushing them and making it impossible to compete with foreign produce. The Bill proposed to obtain the sum of 24 million pounds from several sources, chiefly from the taxation of petrol, and apply it to the reduction of rates in the industries which employed large forces of labour. The China Clay industry would receive relief amounting to something between £60,000 and £80,000 to help it to carry on in competition with the foreign clays. He knew that prosperity in the clay area, particularly in regard to second-class clays, depended upon the last sixpence or shilling in the cost of production in competition with clay being raised in other countries, particularly in the United States. Every penny in these competitive prices counted, and if more capital could be put into the hands of the clay producers, it must result in more work for the men and greater development in the seams by the removal of overburdens, which would also give labour.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

PHARMACEUTICAL SUNDRIES.—The Egyptian Department of Public Health is calling for tenders, to be presented in Cairo by March 16, for the supply of bottles, demijohns, pots, indiarubber tubing, oxygen cylinders, etc. (Reference B.X. 5092.)

Tariff Changes

ITALY.—A Decree Law dated January 21, provides that 10,000 metric tons of sulphate of magnesia for the manufacture of artificial silk (for export) may be imported duty free into Italy up to June 30 next.

MEXICO.—A decree dated November 21 makes an alteration in the export duty on calcium sulphate in mineral form, which is now 5 cts. per 100 kg.; and in that of calcinated calcium sulphate, which is now free.

Welfare of Oil Cake Mill Workers

Home Office Action

THE Home Secretary gives notice that, in pursuance of the powers conferred on him by section 7 of the Police, Factories, etc. (Miscellaneous Provisions) Act, 1916, he proposes to make an order to apply to all factories or parts of factories in which the manufacture of oil cake, extracted meal, or compound cake is carried on, including the incidental operations of refining and grease manufacture.

An order for factories or parts of factories in which the manufacture of oil cake is carried on was made in 1919, and in many factories has been broadly interpreted as applying not only to the manufacture of oil cake but also to meal extraction, the manufacture of compound cake, oil refining, and grease manufacture. In other cases, however, the order has not been regarded as applying to these other processes. As these are carried on under similar conditions and the need for welfare arrangements is equally great, the question of extending the order to include them expressly has been discussed with the Seed Crushing and Compound Cake Manufacturing Joint Industrial Council, and the Council have now informed the Secretary of State that they concur in the extension of the order which is now proposed.

In view of the agreement reached with the Joint Industrial Council, the Secretary of State hopes that no objection will be taken to the draft order; but under the provisions of the Act it is necessary formally to give notice that any objection to the proposed order must be sent to the Secretary of State at the Home Office, Whitehall, London, S.W.1, within thirty days after the date of this notice. The objections must be in writing and must state: (*a*) the requirements in the draft order objected to; (*b*) the specific grounds of objection; and (*c*) the modifications asked for.

The order made in 1919 with regard to employees in oil cake mills, to which reference is made above, deals with welfare provisions, such as messroom accommodation, washing facilities, first aid, and ambulance rooms, etc. (Statutory Rules and Orders, 1919, No. 959.)

Nickel Merger Directorate

THE Right Hon. Lord Melchett, P.C., chairman, the Hon. Henry Mond, deputy chairman, Mr. Robert Mond, Mr. D. Owen Evans, Mr John P. Bickell, and Mr. Grant B. Shipley, directors of the Mond Nickel Co., and Sir Harry McGowan were elected directors of the International Nickel Co. of Canada, at a recent meeting of the board of that company in pursuance with the agreement between the two companies which was confirmed by acceptance of the offer to exchange shares on January 28, 1929.

The Advisory Committee mentioned in the circular to the shareholders has been constituted as follows:—Lord Melchett (chairman), Lord Weir (deputy-chairman), Sir Harry McGowan, Mr. Charles Hayden, Mr. Robert C. Stanley, Mr. James A. Richardson, Mr. John W. McConnell.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

ANGUS CHEMICAL CO., Dudley Hill Road, Undercliffe, Bradford, chemical manufacturers. (C.C., 16/2/29.) £18 5s. 2d. January 9.

M. WHETWELL AND CO., 38, Allen Street, Burnley, extract and essence manufacturers. (C.C., 16/2/29.) £16 18s. 6d. January 5.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case, the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

NEW PROCESS SOAP, LTD., Slough. (M., 16/2/29.) Registered January 31, series of £6,000 debentures, present issue £4,500; general charge.

Receiverships

NEWBRIGHTS, LTD. (R., 16/2/29.) W. H. H. Hutchinson, jnr., C.A., of Royal Insurance Buildings, Bowlalley Lane Hull, was appointed receiver and manager on January 28' 1929, under powers contained in debentures dated Agust 25' 1926.

NOBLE AND SONS (SOUTHEND), LTD. (R., 16/2/29.) W. D. Noble, of 29, Upper Chapman Street, St. Georges in the East, E.1, was appointed receiver and manager on January 31, 1929, under powers contained in debentures dated February 27, 1928, and January 12, 1929.

New Companies Registered

B. M. CHEMICAL PRODUCTS, LTD., 7, Victoria Street, London, S.W.1.—Registered February 12. Nom. capital, £1,000 in £1 shares. Manufacturing chemists, manufacturers of and dealers in chemicals and chemical preparations, etc.

GAS CHAMBERS AND COKE OVENS, LTD.—Registered as a public company on February 11. Nom. capital, £126,000 in 360,000 preferred ordinary shares of 5s. each, and 360,000 deferred ordinary shares of 2s. each. To construct, work, and deal in chamber and coke ovens, retorts, and other apparatus for coal carbonisation, etc., and to adopt an agreement with Bernhard Scholle and Co., Ltd., for the sale to the company of shares in Chamber Ovens, Ltd. A director: B. J. M. Bebb, 5, Cadogan Square, London, S.W.1.

MARTIN'S FERTILISERS, LTD., Crown Bottom, Holmfirth, near Huddersfield.—Registered February 9. Nom. capital, £1,000 in £1 shares. Objects: To carry on the business of manufacturers of, agents for and dealers in fertilisers, chemicals, etc. Directors: C. W. Martin, 128, Newtown, Holmfirth; E. V. Booth.

UNITED CHEMICAL PRODUCTS, LTD., Pomeroy House, 28a, Basinghall Street, London, E.C.2 Registered February 4. Nom. capital, £2,000 in £1 shares. Objects: To carry on the business of manufacturers of machinery, mill stores, belting and china clay, dealers in metals, alloys, oil etc. Directors: D. Rose and D. H. Mason.